COMPARISON OF ACADEMIC PERFORMANCE OF LICENSED PRACTICAL NURSES AND NATIVE NURSING STUDENTS WITHIN AN ASSOCIATE DEGREE PROGRAM

BY

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A DISSERTATION PRESENTED TO THE GRADUATE COUNCIL
OF THE UNIVERSITY OF FLORIDA IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF DOCTOR OF EDUCATION

UNIVERSITY OF FLORIDA

1981

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ACKNOWLEDGEMENTS

This dissertation would not have been possible without the cooperation, assistance, and support of many people. The final paper represents a synthesis, rather than an unguided effort of the credited writer. The writer herein expresses her deep and sincere gratitude to:

Dr. Albert B. Smith, chairman of the doctoral committee, whose comments, questions, and ability to structure helped bring this dissertation to fruition.

Dr. Margaret K. Morgan, cochairman of the committee, whose knowledge, understanding, concern, compassion, and superb editing were invaluable.

Dr. Amanda Baker, Dr. James Hensel, and Dr. Robert Rothberg, members of the committee, whose knowledge, questions, comments, and cooperation helped make this a valuable learning experience. Their support will long be warmly remembered.

The administration, faculty, and students at St. Petersburg Junior College for their cooperation and assistance in the project.

Dr. Rosemary Ammons, whose guidance, help, motivation, and continuous support provided needed encouragement.

Miss Nancy Hartley, whose insight and creativity made the articulation program at St. Petersburg Junior College a reality, and who stimulated her faculty to care about student success.

Dr. Joan Gregory, Mr. George Mayer, and Ms. Shirley Lyons, who helped prepare the data for computer analysis.

Mrs. Susan Osborne and Mrs. Elizabeth Wajdowicz, who gave so freely of their time to aid in the data collection.

Dr. George Schulz, who shared his time and talent in clarifying proposed data treatments.

Mrs. Nancy Rue, a true friend, whose continuous encouragement, empathy, and understanding were so often needed.

My husband, John H. Bierchen, whose support, understanding, patience, and encouragement made this doctoral experience possible. Without him, nothing could have been achieved -- or had meaning.

Joea E. Bierchen

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Abstract of Dissertation Presented to the Graduate
Council of the University of Florida in Partial
Fulfillment of the Requirements for the
Degree of Doctor of Education

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June 1981

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Major Department: Instructional Leadership and Support

The purpose of this study was to determine whether native nursing students and licensed practical nurses (LPNs) who had been integrated into the sophomore year of an on-going associate degree nursing (ADN) program, were comparable in academic performance within and on completion of the program of study. Seven null hypotheses were proposed, postulating no significant difference would be found between these groups on measures of demographic characteristics, academic achievement, program completion, and nationally-standardized tests considered to be predictors of future success in nursing. The study compared the two groups on demographic variables of age, gender, and marital status, cumulative college gradepoint average, attrition, final numerical grades in sophomore nursing courses, performance on the LPN-level and RN-level National League for Nursing Achievement Tests, and performance on State Board Test Pool Examinations for registered nurse licensure.

The population studied was 367 students admitted to all classes graduating between 1975 and 1980 from the ADN program on the Clearwater campus of St. Petersburg Junior College, Clearwater, Florida. The Clearwater curriculum incorporated articulation between levels of technical nursing education, exempting LPNs from all freshman nursing courses, and integrating them into the regular sophomore class.

Relevant data pertaining to the variables under investigation were retrieved from nursing program class lists, grade reports for sophomore nursing courses, student records of cumulative gradepoint averages, reports from the National League for Nursing, and Florida State Board of Nursing reports of licensure examination scores. Data were subjected to statistical comparative analyses by chi square and t test. Results were examined for evidence supporting or rejecting articulation and advanced standing as an effective approach to educational and career mobility for the LPN.

Conclusions: Of the seven hypotheses tested, only two were rejected. Intergroup comparisons showed statistically significant differences in demographic composition and cumulative college gradepoint averages. Data analyses failed to reject the five null hypotheses regarding attrition and cognitive performance. Results are summarized as follows: (1) The LPN group had more students who were older, female, and separated, widowed, or divorced. (2) The LPN group had significantly lower cumulative college gradepoint averages. (3) Although total attrition was higher for native nursing students, controlling for point of program exit found no significant difference between groups in attrition from the sophomore year. (4) The two groups did not differ significantly on final numerical grades in sophomore nursing courses. (5) Although significant differences in favor of the LPNs were found for some components of the LPN-level National League for Nursing Achievement Tests, chi square analysis of overall performance classifying data under significant/not significant showed no significant difference between LPNs and native nursing students. (6) Comparisons of performance on the RN-level National League for Nursing Achievement Tests disclosed a significant difference between groups in favor of the LPN on only one of the ten tests, pharmacology. Chi square analysis of the overall performance on the RN-level Achievement Tests showed no significant difference between groups. (7) Although LPNs tended to score higher on the medical and surgical nursing tests, the two groups did not differ significantly in overall performance on State Board Test Pool Examinations for registered nurse licensure.

CHAPTER I

INTRODUCTION

The need for skilled nursing services continued to grow through the 1970s as societal demands for health care increased. Projections for the 1980s indicated the demand for nursing services would continue to rise as an increasing and aging population sought health care. The widespread shortage of registered nurses, which also marked the close of the 1970s, persisted into the new decade, and became a source of growing national concern. A continuing exodus of nurses from nursing further widened the deficit in nursing manpower. As fewer numbers of new high school graduates sought entrance to nursing programs, nursing educators were impelled to explore new ways to effectively and expeditiously prepare new additions to the numbers available to meet present and future needs for nursing services. One answer was to recruit nontraditional students.

Organized nursing had long espoused the concept of a career ladder. Supporters of an articulated career ladder envisioned nursing as an integrated system. They theorized that each level of nursing preparation incorporated the same fundamental knowledge, attitudes, and skills; each successive level, building and expanding that base. Thus, graduates from one type of nursing program should be able to enter educational programs preparing them for the next level of practice, exempted from elementary courses which presented basic nursing concepts and behaviors, and with advanced standing equivalent to their previous level of educational preparation. As the need to rapidly augment numbers of registered nurses intensified, proposed changes within nursing provided motivation for educational and career mobility. Licensed practical nurses were one possible source of potential applicants for registered nurse preparatory programs. As the problem of expediting effective transition between levels of technical nursing assumed increasing significance, organized nursing and its educational agents were prompted to re-examine articulation between the various levels of educational preparation for nursing practice.

One major barrier to educational articulation as an approach to implementing a career ladder in nursing was the lack of research into the effectiveness of articulation programs in effecting successful transition between levels. Nontraditional systems of nursing education which expedited preparation of the licensed practical nurse for registered nurse practice warranted examination to evaluate the efficacy of articulation for educational and career mobility.

Statement of the Problem

The purpose of this study was to determine whether native nursing students and licensed practical nurses who had been integrated into the sophomore year of an on-going associate degree nursing program were comparable in academic performance within and on completion of the program of study.

The study was concerned with the following seven comparisons between these two groups of students:

1. Selected demographic characteristics of age, gender, and marital status.
2. Cumulative college gradepoint average.
3. Completion/withdrawal from the program.
4. Performance on the licensed practical nurse-level National League for Nursing Achievement Tests.
5. Numerical grades for sophomore nursing courses.
6. Performance on the registered nurse-level National League for Nursing Achievement Tests.
7. Performance on the National State Board Test Pool Examinations for registered nurse licensure.

Background of the Study

The widespread, critical shortage of full-time-employed registered nurses had become a matter of rising national concern ("Commission issues statement," 1980). Projections from national health-associated agencies (USDHEW, 1978a, 1978b; "WICHE reports," 1978) had indicated the shortage of registered nurses would persist, perhaps intensify, through the foreseeable future. Despite a trend toward ambulatory care, 60% of the modern health care centered around traditional in-patient services in such secondary care settings as hospitals and nursing homes. Hospitals continued to employ 80% of all practicing nursing staff (Vaughan, 1980). The American Nurses' Association Commission on Nursing Services identified the nursing shortage as most severe in acute care agencies where patients required skilled nursing care 24 hours a day ("Commission issues statement," 1980). Rising attrition among full-time-employed nurses had reduced numbers available in the nursing manpower pool (Johnson, 1980; Roth, Graham, and Schmittling, 1977).

The nursing shortage had been most acute in the South ("Nationwide survey," 1980), and projections indicated that Sunbelt states, in particular, would experience an increasing demand for nursing services for a growing and aging population (USDHEW, 1978b). In Florida, a popular retirement state, numbers of registered nurses continued to be insufficient to meet normal and seasonal manpower needs. The critical shortage of registered nurses in one county left 1 out of 4 to 5 registered nurse hospital staff positions unfilled. When usual recruiting methods failed to bring results, the area health council was prompted to provide financial and clinical support to the local community college so more students could be admitted to the nursing program (Wajdowicz, 1981). The focus of associate degree nursing education had been to prepare graduates to meet the nursing needs of patients with common and recurring illnesses in secondary care settings, i.e., hospitals and nursing homes (Florida Department of Education, 1977; National League for Nursing, 1978b).

In 1980, Florida had 1 diploma, 9 baccalaureate, and 23 associate degree nursing programs preparing graduates for registered nurse roles in the health care system, and 33 vocational/technical programs preparing graduates for licensure as practical nurses. During the 1976-1977 academic year, Florida associate degree nursing programs provided the major source (77%) of graduates eligible for Florida registered nurse licensure. Baccalaureate programs graduated 18% of all registered nurse candidates. One diploma program provided approximately 5% of all basic registered nurse preparatory program graduates (National League for Nursing, 1978a). Most new associate degree nurses were employed in acute care agencies following graduation. The nursing shortage, however, continued to be severe.

Nationally, declining enrollments and graduations from basic registered nurse preparatory programs had contributed fewer new graduates to the diminishing supply of registered nurses (Johnson, 1978; Moses and Roth, 1979). These trends also were expected to continue through future years (Vaughn and Johnson, 1979), and were likely to affect the quantity and quality of available modern health care services. In nursing, interest centered on achieving innovative changes in nursing education curricula to meet existing and projected needs (American Nurses' Association, 1980). As recently as 1976, however, Fox found a paucity of information regarding career mobility curricula in registered nurse education. Researchers discovered that the concept of career mobility was a controversial one (Notter, 1977), and that transfer of credit toward advanced standing was problematic in nursing (Kelly, 1978; Lenburg, 1975) and in allied health programs in general (Boatman, 1978).

The term "open curriculum" had been used to describe a wide variety of approaches to advanced placement and career mobility in nursing education (Lenburg, 1975). Although an interest in open curriculum practices in nursing began in the 1970s, and the California legislature mandated an articulated educational ladder be developed to permit students to progress from licensed practical nurse preparation through master's degree programs without impediments (Waters, 1975), Bullough (1971) found most nurse educators expressed "concerned ambivalence" toward the trends of openness and mobility. Career mobility had been generally restricted, and interpreted by most as progression from diploma or associate degree registered nurse (ADN) to baccalaureate nurse (BSN). Toward the close of the decade, actions by professional nursing organizations clearly legitimized educational mobility in nursing, and placed emphasis on development of innovative curriculum changes in nursing education to facilitate career mobility (Styles and Wilson, 1979). Social and occupational trends indicated evaluative research was needed on the transition from licensed practical nurse to registered nurse. Little, however, had been written on the subject.

Education for Technical Nursing

Formal requirements and education for the practice of nursing were established little more than a century ago (Montag, 1980). The modern structure devolved from the traditional, three-year, in-house, hospital-trained, diploma-graduate nurse to the several levels of nursing personnel practicing today. Each of these levels -- nursing assistant, licensed practical or vocational nurse, and registered nurse -- required a different education specific to the type of patient care provided by graduates of these programs. Prior to licensure, the registered nurse might have been prepared in a diploma, associate degree, or baccalaureate nursing program. The prevailing occupational structure of nursing reflected past responses of organized nursing and its educational agents to the problem of providing adequate numbers of skilled personnel to deliver bedside care. Education for the practice of nursing had changed.

During World War II, hospitals recruited practical nurses to meet domestic needs for nursing care. For the most part, these were women who had gained their nursing skills through experience rather than through formal education (Rines, 1977). By 1948, researchers had identified three types of nursing graduates and much confusion regarding their roles and functions (Brown, 1948; Committee on the Functions of Nursing, 1948). These researchers made recommendations that only two categories of nurses continue. The Brown (1948) report recommended that registered nurse preparatory programs be established in community colleges. The Committee on the Functions of Nursing (1948) recommended shortening the registered nurse curriculum to less than the then conventional three-year diploma preparation.

Montag (1951) also advocated preparation of only two types of nurses, i.e., technical and professional, and proposed development of two-year programs to prepare nursing technicians. These health workers would be taught to perform technical functions at the registered nurse level, meet requirements for the associate degree, and qualify for registered nurse licensure (Montag, 1959). Thus, as a result of recommendations by Brown and the Committee on the Functions of Nursing, and in view of the successes of both the Cadet Nurse Corps programs of World War II and the Canadian Experiment at the Metropolitan School of Nursing in Windsor, Ontario, a fourth type of education for the practice of nursing emerged in the 1950s (Rines, 1977). During the next two decades, associate degree nursing programs experienced rapid growth and wide acceptance, their growth paralleling and accompanying the burgeoning community college movement. A basic premise of these associate degree nursing programs had been that technical nursing was pragmatic; thus, it had to be designed to prepare graduates to meet specific needs for care present in the surrounding community. Competencies expected of these graduates were those deemed essential to provide direct bedside care to patients with common and recurring illnesses in the secondary care setting (National League for Nursing, 1978b; Southern Regional Education Board, 1976).

Issues and Trends in Nursing

The American Nurses' Association (ANA) had forecast that an expanded role of the nurse as a primary health care provider would become necessary to meet future societal needs for health care.

An ANA position paper, issued in 1965, recommended changes in the educational preparation for nursing practice. The baccalaureate degree (BSN) was identified as the minimum educational preparation for beginning professional practice, and the associate degree (ADN) for entry into technical nursing (American Nurses' Association, 1965). The 1978 ANA National Convention passed Resolution 56 which specified that two categories of nursing practice be clearly identified and titled. National guidelines for implementation of the two categories were to be developed and reported to the 1980 House of Delegates. The ANA set 1985 as the date for establishing two categories of practice.

At the 1980 Convention, the ANA Task Force on Entry into Practice suggested "nurse" and "nurse associate" as titles for the two new categories of practice, and recommended continuing refinement of these separate concepts. A substitute resolution was introduced to defer titling until the Commission completed a comprehensive statement of category competencies. In related actions, the 1980 ANA House of Delegates urged further consideration be given the impact of proposed changes on minority nurses, and emphasis be increased on development of flexible educational opportunities for nurses seeking degrees. Such actions were viewed as necessary to increase accessibility to nursing by expanding educational options, and facilitating career mobility. The resolution regarding implementation of the 1985 proposal on Entry into Practice was withdrawn by the sponsor, the Committee on Economic and General Welfare, as premature.

Another related action taken by the 1980 House of Delegates was passage of Resolution 25 which called for a restructuring of credentialing for nursing, and established a national credentialing center for coordinating licensure or registration, certification of individual nurses, and accreditation of nursing services and nursing education programs ("American Nurses' Association," 1980; "Highlights," 1980). The Council of Associate Degree Programs of the National League for Nursing (NLN) had been openly critical of the ANA Credentialing Study. The NLN statement ("NLN's interdivision coordinating committee," 1980) expressed a need to produce more specific information on credentialing today in advance of establishing a model for credentialing for tomorrow. It recommended careful study of evidence presented by individuals and organizations affected by credentialing prior to taking further action. The NLN Council reaffirmed support of present licensing and titling procedures enabling ADN graduates to secure licensure as registered nurses. Further, the Council re-emphasized commitment to providing leadership toward further implementation on the open curriculum in nursing and educational mobility.

Actions taken by the 1980 ANA House of Delegates indicated successful resolution of the Entry into Practice issue was yet to be achieved. However, the ANA recommendations also carried implications for the future of both nursing practice and education for practice. Current data showed a consistent average growth rate of 1.76 for registered nurse graduations from baccalaureate programs (Johnson, 1978;

Vaughn and Johnson, 1979; Johnson, 1980). Such data suggested an increasing recognition of the inevitability of establishing two categories of practice, and indicated a need to consider further development of articulation programs to increase opportunities for career and educational mobility.

Educational Mobility

The importance of and need for a viable educational career ladder for nurses had long been recognized. The 1970 and 1971 Carnegie Commissions on Higher Education recommended developing routes of entry other than full-time attendance in collegiate programs. The Commissions suggested such action would afford opportunity for career advancement, increase accessibility, and remove barriers to career mobility. Further, they recommended use of equivalency and proficiency examinations to facilitate transferability between programs (Carnegie, 1970, 1971). Lenburg (1975), however, found marked variability in credit granted students with prior nursing education, and few transfer students were exempted from basic educational and occupational experiences. Kelly (1978) noted that nursing education generally granted students with various backgrounds admission to programs, but failed to recognize or grant credit for prior experience. She commented that, although upward educational and career mobility had been restricted, many states permitted students in registered nurse programs to take examinations for licensure as practical nurses. Licensed practical nurses, however, were required to complete the entire registered nurse curriculum to be eligible for licensure.

The several issues and problems associated with implementing educational mobility included those related to the open curriculum (Waters, 1975) and conflicting philosophies (Montag, 1975). Notter (1977) found the concept of career mobility was controversial and articulated programs were considered innovative. Boatman(1978), reporting on a three-year North Carolina project to aid individuals in transferring allied health credits between settings in higher education, observed that such transfer was much more difficult than in any other field of study. He found attitudes and practices in higher education erected unnecessary barriers for those seeking career mobility. Story (1974) suggested that career mobility curricula should provide entry points which reduced repetition of subject material to a minimum. She pointed out the necessity and difficulty of evaluating equivalency of competency in specific knowledge, skills, and attitudes.

Organized nursing had long espoused the concept of a career ladder through which those educated for one level of nursing practice might progress to the next level by successfully completing additional educational preparation. Articulation between levels, however, had been difficult for many seeking to pursue additional academic credentials in nursing and to expand their knowledge and skills for entrance into the next level of practice. Further, most nursing educators interpreted career mobility as related to programs which enabled diploma or associate degree registered nurses to earn a baccalaureate (BSN) degree. Little had been recorded in the literature regarding the step from licensed practical or vocational nurse to registered nurse.

Neither the 1965 ANA position paper (American Nurses' Association, 1965), nor any subsequent statements specifically addressed the role of the licensed practical nurse. However, the statement which identified the associate degree as minimum preparation for technical nursing practice had been interpreted by some as indicative of a future move to phase out vocational nursing programs. No data were available regarding numbers or growth rates for licensed practical nurse graduations from associate or baccalaureate degree programs.

Several projected social and occupational trends justified the examination of existing nontraditional approaches toward expediting the preparation of the licensed practical or vocational nurse for registered nurse practice. Effective articulation programs might provide one answer to educational needs for career mobility, and expedite graduations of license-eligible persons to augment the diminishing pool of registered nurses. Data were needed to determine the applicability of such approaches to nursing, as well as the efficacy of articulation in meeting practical nurse needs for career mobility.

Kaiser (1975) compared students enrolled in practical and associate degree nursing programs and found many similarities and few differences in descriptive characteristics, suggesting that both levels of nursing education had drawn from the same population. However, Kaiser explored no measures of cognitive performance. The need to evaluate the validity of an open curriculum, or articulation, career ladder in nursing education warranted an examination of the academic performance of licensed practical nurses who had been integrated into an associate degree nursing program.

Examination of the career ladder nursing program on the Clearwater campus of St. Petersburg Junior College provided data for evaluating the effectiveness of articulation which integrates licensed practical nurses into an associate degree nursing program. If the proposed comparison measures demonstrated comparability of academic performance between native nursing students and licensed practical nurses, such findings would support articulation as a mechanism for increasing career mobility for the licensed practical nurse.

Definition of Terms

The following operational definitions were used in this study:

Academic performance - demonstrated knowledge, theory, and concepts acquired through formal nursing education as manifested in scores achieved on cognitive testing.

Allied health - the several paraprofessions associated with modern health care, e.g., dental technology, medical laboratory technology, optometric technology, physical therapy, respiratory therapy, and others.

Articulation - a systematized approach to educational mobility which provides graduates of one level of educational preparation with advanced placement in programs at the next level; eliminates repetition of basic learning experiences common to both levels, reducing redundancy, and expediting progress toward the more advanced credential.

Career ladder - a hierarchical occupational framework which describes various employment positions in nursing, and requisite roles and functions within the organizational structure of the health care system as correlated with specific identified knowledge, skills, educational preparation, and licensure; nursing assistant, licensed practical nurse, associate degree registered nurse.

Licensed practical nurse students (LPN) - students who have completed a one-year course of study in a vocational/technical nursing program, and have passed licensure examinations prior to entrance into the second academic year of the Clearwater nursing program; students exempted from first-year nursing courses.

National League for Nursing (NLN) - professional organization responsible for construction of standardized examinations for achievement testing in nursing programs and/or state licensure. Provides consultants and educational workshops for curriculum development and professional accreditation of nursing programs.

Native nursing students - students who enroll in and complete the full two-year sequence (four academic sessions) in the Clearwater nursing program.

Open curriculum - a planned program of learning experiences which provides for other than a single entry and exit; a program which increases educational options for career mobility.

Assumptions

This study included the following assumptions:

1. Demonstration of comparable terminal performance on nationally standardized tests provides empirical support for the premise that graduates of one educational level in nursing (LPN) are

able to enter programs at the next level (ADN) without repeating previous learning, and with reasonable expectations of success.

2. Validity and reliability of selected standardized tests (National League for Nursing Achievement Tests and State Board Test Pool Examinations) had been sufficiently demonstrated, and were predictive of successful performance in nursing.
3. The effects of program learning activities were distributed equally among both LPN and ADN student groups since LPN students were integrated into the current sophomore class and taught along with native nursing students.
4. Randomization had distributed equally over both groups all variables except previous nursing education.
5. Any relationship between variables under study would be linear.

Delimitations and Limitations

The study population was delimited to native nursing students admitted to the St. Petersburg Junior College Clearwater campus nursing program between the years of 1973 and 1978, and licensed practical nurses admitted to the program between 1974 and 1979. Since licensed practical nurses were exempted from all freshman nursing courses, comparative measures of academic performance in nursing were delimited to National League for Nursing LPN and RN-level Achievement Tests, numerical grades in sophomore nursing courses, and State Board Test Pool Examination scores.

A major limitation of the study was that instruments used for the research measured only cognitive knowledge of the students in registered nurse curricula, and did not include measurement of psychomotor clinical skills.

Findings of this study are limited to the population and program studied. Generalizations may be made only to programs that are qualitatively and quantitatively similar.

Organization of the Remainder of the Dissertation

The remainder of this research report is organized as follows:

Chapter II presents a selective review of the literature as related to the underlying concepts and values, patterns and problems in articulation, equivalency evaluation and career mobility. The chapter concludes with a description of implications for the future.

Chapter III describes the development of the research design, the hypotheses, the methodology, instruments, and procedures.

Chapter IV reports the findings of the statistical analyses, and summarizes the results.

Chapter V presents a brief overview of the study and the findings, discusses the conclusions, and suggests areas for future research.

CHAPTER II

REVIEW OF LITERATURE

Articulation between nursing education programs was not a new concept. Historically, however, articulation had been limited to diploma graduates seeking entrance to baccalaureate nursing programs. Blanket transfer of credit was common in the early 1950s, when nursing was a relative newcomer to academia. The consistency of transferability of credit which facilitated smooth transition between levels, however, had diminished since nursing entered the mainstream of higher education. A rising demand by the educational consumer for career mobility created a renewed interest in articulation. The increasing complexity of modern health care technology, which required further education for delivery of safe, effective nursing care, also contributed to an interest in articulation, as did proposed actions to establish higher education as a minimum for the practice of nursing.

Underlying Concepts and Values

In classic nursing literature, both past (Brown, 1948) and contemporary (Lysaught, 1970, 1973), organized nursing had been clearly identified as a service-directed occupation, with an obligation to respond effectively to society's changing needs for health care. The complexities of modern technical nursing required a minimum of two years of education for the direct care of patients experiencing common and recurring illnesses (Montag, 1951, 1959, 1975, 1980; Bensman, 1977; Rines, 1977). Forecasts for the future role of nursing supported the premise that a broad knowledge base was necessary to meet patient needs effectively (Bevis, 1978). Proponents of articulation stated that, like all professions and vocations, nursing had unique information specific to that area --- a core curriculum shaped by all educational levels of preparation within that profession or technical area (Boyle, 1972; Hansen, 1976; Lenburg, 1975; McIrney, 1976; Sherrill, 1974; Story, 1974; Waters, 1975). Licensure had been equated with achievement of minimum competence for practice at a given level. Articulation provided a smooth transition from one level of educational preparation to the next, a major element contributing to career mobility (Boatman, 1978; Wilson, 1976). Articulation was also consistent with the American ethio of equal access and opportunity to meet personal needs and career goals. Further, it was congruent with nursing's professional commitment to provide adequate numbers of personnel qualified to meet the need for health care services in the community.

Patterns and Problems in Articulation

The California Department of Education (Sherrill, 1974), the Southern Regional Education Board (1976), the Florida Department of Education (1977), and the National League for Nursing (1978b) had sought to identify the common core of knowledge required for nursing. Their efforts had centered on determining the competencies essential to the provision of basic nursing care. The clear delineation of roles, levels, functions, required competencies, and associated learning needs still awaited the future. Establishing such guidelines should facilitate articulation between educational levels for nursing practice, providing more objective means of evaluating students seeking advanced standing. However, there were two prevailing schools of thought regarding articulation. One contended that each type of nursing program was fundamentally different in educational goals, and did not provide an adequate theoretical or clinical foundation for another type of nursing program (Notter,1977; Schlotfeldt, 1977; Haase, 1979). The opposing viewpoint favored articulation, proclaiming that nursing education was comprised of a common core of nursing knowledge, attitudes, and behaviors.

Patterns, policies, and procedures for granting advanced standing varied among programs, but interest in developing more uniform approaches to career mobility had increased. The 1974 California legislature mandated that all nursing schools in the state should provide a course of study enabling students to qualify for vocational nurse licensure in the first 18 months of enrollment, and for registered nurse licensure within the first three years, six semesters, or nine quarters, whichever was the lesser time period. Although creating multiple problems for educators, this legislation made articulation a reality in California (Waters, 1975).

More recently, the National League for Nursing commissioned the Interdivision Coordinating Committee to begin an intercouncil study "... to promote sound and appropriate program articulation procedures ..." ("Board seeks proper role," 1980). The committee held several preliminary discussions with an official of the Council on Postsecondary Accreditation (COPA), and determined that rising demands by educational consumers would increase pressures for articulation between the community college and university programs. Both organizations acknowledged a responsibility for development of guidelines to facilitate both career mobility and accreditation. COPA identified three issues of primary concern: purpose and content of program completed, nature of receiving programs, and quality of the individual's academic work.

In Florida, the Nursing Education Study/Advisory Group established by the Commissioner of Education adopted a resolution affirming that the State's "... nursing educational programs should be considered a professional development system ..." which increased access to and choice of formal education in the field of nursing, and that students should be given the opportunity to enter and progress through the system in a manner which recognized previously acquired competencies (Florida Department of Education, 1980, p. 25).

The need for developing a consistent plan and pattern for articulation between educational levels had received attention in other allied health professions. Two Michigan institutions, Ferris State

College and Central Michigan University, developed a joint experimental external degree program in 1980. The pilot program offered undergraduate degrees in environmental health and health services management through Ferris, and graduate programs in environmental health and health care administration at Central Michigan University ("Ferris State College," 1980). Kentucky initiated a project, funded in part by the then Department of Health, Education, and Welfare, to develop articulation for six allied health clusters: clinical laboratory, auxilliary dental fields, dietetics and nutrition, radiography, rehabilitation therapy, and respiratory therapy. The Kentucky State Council on Higher Education was selected to direct the project, and identified a need for effective articulation programs to increase career mobility. The criteria used to select clusters for the project specified existing role differentiation in practice, demand for, and readiness to develop ladder programs ("Respiratory therapists involved," 1980).

Of major importance in open curriculum and articulation programs, granting credit or advanced standing for previous learning experiences presented the problem of evaluation of competency. Cobin, Traber, and Bullough (1976) commented that the problem of granting blanket credit for previous education could result in a lack of integration of clinical and cognitive aspects. California schools, however, were leaders in articulation. Several approaches to articulation emerged in California nursing programs in the early 1970s. A nursing consortium in Orange and Long Beach counties developed a five-step articulation ladder involving the five community colleges and three universities. Students were able to progress through this multiple entry/exit educational system from nurse assistand through masters degree nursing education (Cobin, Traber, and Bullough, 1976). The California approach to articulation specified the nursing content appropriate to the identified articulation steps. Wu (1978) described the curriculum at California State University at Los Angeles as providing 24 semester hours of lower division "preprofessional" nursing courses. Upon reviewing curricula, articulation agreements were developed with programs with essentially equivalent lower division content. Associate degree nurses who submitted 36 to 42 semester hours from their programs received 24 hours transfer credit. Evaluation of the academic performance of diploma graduates during the initial year of the CSU articulation program showed no significant differences in performance as compared with associate degree graduates. Thus, diploma graduates also received 24 hours of transfer credit if their basic program was accredited by the National League for Nursing.

Jones (1978) explored attitudes toward open curriculum and articulation among community college nursing personnel in the Carolinas. She found more administrators than instructors agreed to the need to facilitate licensed practical nurse career mobility. Baker (1979) found the majority of nursing faculty in the 42 Illinois community colleges agreed licensed practical nurses should be granted advanced standing on the basis of proficiency or teacher-made tests, but that these students should be exempted from basic fundamentals of nursing only, and must complete nursing courses in all other areas.

Equivalency Evaluation

One major issue in developing articulation programs had been the problem of evaluating equivalent theoretical and clinical preparation. Concern for maintaining high standards in nursing was part of the rationale for evaluating equivalency (Thomas et al., 1979). As Lenburg observed, the concept of evaluation was not new, but had received impetus in higher education in the 1960s with the development of the College Level Examination Program (CLEP). The National League for Nursing issued a position paper in 1965, opposing the granting of blanket credit. That same year, that organization reported development of the Graduate Nurse Examination (GNE), and the Steering Committee of the Department of Baccalaureate and Higher Degree Programs approved the GNE for use in placement of graduates of other nursing programs. In 1969, in view of the increasing use of proficiency examinations for registered nurse admission to baccalaureate programs, the NLN recommended use of such examinations should be reviewed in relation to individual program and course goals and objectives (Litwack, Sakata, and Wykle, 1972).

With increasing emphasis on open curriculum and nontraditional programs in nursing, four patterns for advanced placement emerged:

1. Previous Licensure Model: Students admitted to a program designed to build on a prior level of nursing education.
2. Advanced Placement Model: Students admitted to regular basic program with advanced standing by direct transfer of previous credits, or through equivalency examination. (NOTE: Percentile scores on selected NLN Achievement Tests were used by some programs for purposes of granting advanced standing.)
3. Multiple Sequence Model: Students admitted to a program designed to permit multiple exit credentialing at different levels of the career ladder.
4. Assessment Model: Students awarded an external degree on the basis of demonstration of competency and achievement of program goals, as opposed to compulsory attendance and completion of a prescribed program of learning. (Lenburg, Johnson, and Vahey, 1973).

Wilson (1976) observed that opposition to equivalency evaluation and advanced standing rested on a vague, emotional belief system, rather than predicated on a sound, rational basis. Varying program philosophies and faculty beliefs had affected acceptance of standardized equivalency evaluations. As a result, mechanisms for granting advanced standing demonstrated a wide disparity between espousal of articulation and actual practices for educational mobility.

Wilson (1972) stated that the basis for equivalency evaluation was explicit formulation and delineation of appropriate curriculum goals and competencies. Clear definition of knowledge, attitudes, and skills to be demonstrated on termination of the program of study should serve to identify competencies acquired through previous learning experiences, and those yet required for the achievement of individual, program, and institutional goals. Katzell (1970) also recommended the use of proficiency testing to determine achievement of required competencies. Discussing the open curriculum in nursing, Katzell (1973) suggested performance evaluation for articulation be accomplished through 1) challenge options for all credits required to complete the program, or 2) a program wherein placement would be automatically awarded to candidates with demonstrated prior level preparation, i.e., licensure.

Waters (1975) identified a need for comprehensive conceptual frameworks for nursing education to permit students to enter, expand knowledge, demonstrate competence in performance, and progress within a unified educational system. Specification of expected terminal competencies and behaviors consistent with a given level of practice was a beginning step. The Associate Degree Council of the National League for Nursing identified specific terminal nursing behaviors expected of its graduates (National League for Nursing, 1978b). The Practical Nurse Council, and the Council of Baccalaureate and Higher Degree programs had made progress toward the same goal. Such measures should enable graduates to present licensure as sufficient credentials of demonstrated proficiency in meeting core criteria for that level of practice, qualifying them for entrance into education for the next level of practice. Traditionally, vocational programs had focused on the 'hands-on' basic care under the direction of a registered nurse. Licensure demonstrated associate degree graduates had gained the additional nursing theory, attitudes, and skills necessary to provide registered nurse level of care. Baccalaureate nursing programs provided their graduates with the additional theory and practice needed to deliver care to clients in community settings, and to assume some client management positions. If accepted uniformly, demonstration of such equivalency would facilitate implementation of any of the four types of career mobility programs, and reassure faculty of a uniform minimum competence of native and articulation students. Further, students would enter the next educational level with reasonable expectations of success.

Predictors of Successful Nursing Performance

Predictors of successful nursing performance upon completion of a given course of study had been the subject of much interest in nursing education research. Schwirian's (1978a, 1978b) comprehensive critical review of the literature and research for 1965 through 1975 reported on 238 studies related to identification and utilization of predictors of nursing success. Among multiple variables used in establishing admission criteria and in-program evaluation, only two categories were considered significant in predicting success in nursing: (1) academic achievement while enrolled, and (2) post-graduation performance on the State Board Test Pool Examinations (SBTPE).

Studies regarding prediction of performance in nursing school generally identified theory grades and gradepoint average (GPA) as significant. Course grades received for clinical performance had not proven reliable predictors on cognitive measures of success (Ledbetter, 1968; Schwirian, 1978a). Performance on licensure examinations (SBTPE) had generally been accepted as descriptive of achievement of nursing knowledge integral to minimum acceptable performance as a practicing nurse. State and national accrediting agencies considered graduate performance on SBTPE one important measure of program effectiveness. Many research studies had explored the relationship between numerous variables and performance on the SBTPE. The measure most consistently correlated with performance on SBTPE was the NLN Achievement Test sequence given in most programs of nursing education (Brandt, Hastie, and Schumann, 1966; Miller, Feldhausen, and Asher, 1968; Papcum, 1971; Anguluan, 1973; Bell and Martindill, 1976; Deardorff, 1976; Shelley, Kennamer, and Raile, 1976; Perez, 1976; Schwirian, 1978a; Woffle, 1978). In 1970, Katzell had suggested using the NLN Achievement Tests for evaluation of competency equivalency for career mobility.

Evaluation and Career Mobility

Sachs (1980a) defined evaluation as the systematic approach to estimating the value of educational activity outcomes, and designed to determine the success of educational activities. Sachs (1980b) identified standardized tests as instruments prepared by experts external to any given program, and constructed to measure performance in many different schools. Both the National League for Nursing Achievement Tests and the State Board Test Pool Examinations were examples of standardized tests. As such, they had been constructed by representatives from many different nursing programs from the various geographic subdivisions of the nation, and the various levels of nursing practice. SBTPE questions were then reviewed by the Council of State Boards of Nursing for relevance and estimated measure of minimum competency to practice at a given level of licensure. These two identified predictors of successful nursing performance in practice had been used extensively by both traditional and career mobility programs as measures of program effectiveness. Notter and Robey (1979) reported the results of a National League for Nursing research study of 601 open curriculum programs. The majority of respondents (69.7%) reported using SBTPE scores as a primary component of program evaluation.

Sherrod (1975) discussed the five-year evaluation of an articulation ladder curriculum at Ferris State College wherein native nursing students were prepared for eligibility for practical nurse licensure in one calendar year, and proceeded through the second year to become eligible for registered nurse licensure. Licensed practical nurses were admitted directly to the second year curriculum. Scores on the National League for Nursing Achievement Tests and SBTPE were used in evaluation of program effectiveness in meeting its goals for the second year. Calculated second-year attrition rates were low, and the percentage passing licensure examinations was high (92%).

Davidson (1975) described the career ladder curriculum at Pasadena City College, one of the programs resulting from the California mandate of 1972. This open curriculum modular program was adopted in 1973, and had been reported as successful in meeting its goals of preparing graduates for licensure. National League for Nursing Achievement Tests were used for evaluation and counseling.

In Texas, Laredo Junior College instituted a career ladder program with multiple entry and exit options in 1972. Students were permitted to enter and exit at several points in the program. Students who exited at the end of the first session (19 semester hours) were eligible for employment as health assistants. Students continuing and completing 14 additional semester hours of general education courses and 20 hours of nursing courses were eligible for licensure as practical nurses. Completion of an additional 19 semester hours of general education and 5 semester hours of nursing courses qualified graduates for the associate degree in nursing, and thus eligible for licensure as registered nurses. Program evaluation was predicated on percent passing the State Board Test Pool Examinations. (Schmidt, 1975)

The multiple-exit program offered at State College of Arkansas (Garner, 1975) provided students with the opportunity to terminate at the end of the program's first year courses prepared to practice as licensed practical nurses. Students who elected to exit on completion of the second year had been prepared to practice at the associate degree level for registered nursing. Successfully completing the final two years of the curriculum resulted in attainment of the BSN degree, and where applicable, eligibility for licensure as a registered nurse. Licensed practical nurses admitted to the associate degree curriculum were required to challenge all first-year nursing courses successfully. Transfer credit was granted graduates of other associate degree programs, with entrance to third year courses. Faculties used the National League for Nursing Achievement Tests and State Board Test Pool Examinations in program evaluation.

Farley's (1978) evaluative study of students' academic and clinical achievement in one California career ladder program found that programs that focused on mobility had low attrition. The overall attrition rate was significantly lower than the national average for associate degree nursing programs. Further, 86.4% of all students admitted were successful at either the practical or registered nurse level on licensure examinations. Of particular note was the finding that 51% of the lowest ability students succeeded in completing the program at the registered nurse level with a cumulative college GPA of 2.9 and a mean score on the five components of the licensing examination of 550, where minimum passing score for each component was 350.

Notter and Robey (1979) reported that 81.3% of all respondents participating in the National League for Nursing study of open curriculum practices believed their program was successful in assisting students to complete the program. The majority of the respondents (70%) reported their programs as successful in meeting needs of area health agencies. An additional 27.7% reported partial success in meeting local health care needs. Most respondents (76.7%) reported the open curriculum as an important aid in recruiting students. Others (19.8%) reported partial success in recruiting as attributable to the open curriculum. Respondents reported the recruitment of potential students was the most influential factor in establishing open curriculum practices in their nursing programs.

Sachs (1980c) stated the open curriculum required an appraisal of the individual's previous education and experiences; such appraisal was necessary for accurate placement in a program of learning which would provide needed learning experiences pursuant to career goals. She suggested the desirability of comparing the aptitudes and achievement level of the applicant with those of native students by administering the same evaluation tools. Proficiency tests were described by Sachs as designed to evaluate the knowledge and skills which determined competency to perform specific functions; equivalency testing was designed to equate non-formal and academic learning.

Implications for the Future

The need for skilled nursing care had continued to grow (USDHEW, 1978a), as continuing attrition among the full-time-employed (Johnson, 1980; Vaughn, 1980), and declining enrollments and graduations from registered nurse preparatory programs reduced numbers in the health manpower pool. The growth of basic registered nurse programs had remained static (Vaughn and Johnson, 1979). Only associate degree nursing programs continued to evidence growth, and that growth appeared to have moderated. Nursing education, as the agent charged with the responsibility for preparing new entrants into the field of nursing, had been searching for new and effective approaches to meet its commitments to both the educational and the health care consumer.

Professional nursing organizations had reaffirmed their commitment to career mobility ("American Nurses' Association," 1980; National League for Nursing, 1980). Notter and Robey (1979) stated that the open curriculum had rapidly become a necessity in modern nursing education. They concluded that the entry into practice issue and the establishment of two categories of nursing practice would result in further demands by nondegree nurses for access to expedited programs. Such educational options would permit achievement of desired roles and status. Further, they stated that any legislative actions designed to legally implement two categories of practice would also carry probable mandates for upward mobility educational programs.

Summary and Conclusions of Literature Review

The review of the literature resulted in the finding that the majority of successful open curricula in nursing were multiple entry/exit structures. Advanced placement programs had provided the mobility-seeker with an expedited route to the goal, reduced redundancy, and given credence to the premise that nursing had a core of experiences common to all levels. The major stumbling block to educational mobility had been evaluating equivalency and competence.

The National League for Nursing Achievement Tests and the State Board Test Pool Examinations had been used by both open curriculum and traditional nursing programs for program evaluation. Such tests were designed to evaluate knowledge of theory and concepts essential to proficient nursing at a given level of practice. The National League for Nursing Achievement Tests had been identified as consistent, accurate predictors of scores on the State Board Test Pool Examinations. Performance on licensure examinations had been generally accepted as indicating achievement of nursing knowledge required for minimum acceptable performance as a practicing nurse. Successful achievement on licensure examinations for practice as a practical nurse, then, should be indicative of the ability to successfully complete curricular requirements for registered nurse licensure without repetition of previous learning.

The literature review, however, found little information had been reported regarding the comparative performance of licensed practical nurses (LPNs) and native nursing students in associate degree programs. Studies on the performance of these two groups on standard cognitive measures of academic success, i.e., cumulative college gradepoint average, and grades in nursing courses, and on the identified predictors of nursing success, i.e., National League for Nursing Achievement Tests and State Board Test Pool Examinations, were not found in this review. As a result, as outlined in the next chapter, this study was developed to evaluate the effectiveness of articulation in meeting the needs of licensed practical nurses for educational and career mobility.

CHAPTER III

PROCEDURE

This retrospective study was designed to evaluate the efficacy of an associate degree nursing program which had incorporated educational articulation between the levels of technical nursing, i.e., licensed practical nurse and associate degree registered nurse, into the basic curriculum design. The nursing program on the Clearwater campus of St. Petersburg Junior College, Clearwater, Florida, allowed licensed practical nurses to articulate into the regular sophomore nursing curriculum, granting them advanced standing equivalent to their previous nursing education (one year) on the basis of licensure. Data collected from institutional records were used to compare their performance with that of native nursing students who had been in the program for the freshman year. This chapter presents the rationale for the research design, instruments used for evaluation, and the methodology and procedures used in the study.

Rationale

Authorities have agreed that evaluation has been integral to making appropriate curriculum decisions (Broski, 1976; Schulberg and Baker, 1979; Schwirian, 1978a; Staropoli and Waltz, 1978; Steele, 1978; Stufflebeam et al., 1971). Farran (1979) stated that, while curriculum evaluation has necessarily been somewhat ex post facto, the data have provided a basis for decisions regarding future program-related actions. National standardized tests for certification and licensure have been widely used in nursing and allied health education to determine program effectiveness via product evaluation. One generally accepted measure of program success in meeting educational goals has been the number of graduates who achieved licensure to practice. Most nursing programs, both traditional and open curricula, have used such normative tests to gather comparative measures of student performance. National League for Nursing (NLN) Achievement Tests and the State Board Test Pool Examinations (SBTPE) have been used to (1) identify the level of student performance as compared with peers from other programs throughout the country, and (2) determine program areas of strength and weakness in facilitating achievement of program and institutional goals. These data have been considered predictive of subsequent success in nursing practice (Schwirian, 1978a, 1978b). Further, normative data collected with these instruments have been used to compare groups of students within a given program (Garner, 1975). Other measures which have been used in comparing groups of students include gradepoint average (GPA) and course grades (Garner, 1975). In this study, such data were examined to support or reject articulation as a solution to the educational and career mobility needs of the licensed practical nurse.

Selection of Comparison Measures

A review of the literature, discussions with administrators and faculty of associate degree nursing (ADN) programs, and the investigator's previous experiences as a faculty member in diploma, ADN, and baccalaureate (BSN) nursing programs indicated the desirability of incorporating the NLN Achievement Tests and the SBTPE as comparative measures in this study design. Kaiser's (1975) study of students enrolled in practical and ADN programs suggested demographic variables of age, gender, and marital status would aid in comparing characteristics of the two groups of students. For this reason, these variables were included in this research. Program evaluation procedures used in the Career Option Nursing Education (CONE) program at State College of Arkansas (Garner, 1975) suggested the general form for the design of this study of the comparative academic performance of licensed practical nurse (LPN) articulation students and native nursing students.

Although the program at State College of Arkansas offered the baccalaureate degree in nursing, the multiple-exit structure was similar to articulation models found in technical nursing programs. Students at State College of Arkansas were provided an opportunity to terminate after completing their first year courses successfully, showing that they were prepared to practice as licensed practical nurses. On completing the second year, exiting students were prepared for practice at the ADN level for registered nursing. Those students who completed the final two years of the nursing curriculum successfully received the BSN degree and, where applicable, were eligible for registered nurse licensure. Licensed practical nurses admitted to the ADN curriculum were required to challenge successfully all first year nursing courses. Graduates of ADN programs, however, transferred credit directly, and were admitted to third year courses. Comparative evaluation techniques for CONE students included comparison of demographic data using chi square. American College Testing (ACT) scores, science course grades, NLN Achievement Tests, and SBTPE were compared by t test.

Comparative measures selected for this study represented a modification of the CONE approach to program evaluation. Cumulative college gradepoint average was substituted for ACT scores, and final numerical grades in sophomore nursing courses for science grades. The NLN Achievement Tests used in licensed practical nurse programs, not included in the CONE study, constituted an additional comparative measure. Other CONE comparative measures, i.e., registered nurse (RN) level NLN Achievement Tests and SBTPE, and statistical treatments, were replicated. Chi square analyses of the two groups overall performance on the selected measures of academic performance, combining data under categories of significant/not significant, provided an additional method of determining whether the two student populations differed in achievement within and on completion of the program. In addition, attrition from each group of students was examined.

Description of the NLN Achievement Tests

During the preceding several decades, the National League for Nursing had provided numerous standardized examinations to aid nursing faculties in evaluating student achievement of educational objectives. Achievement tests had been available for anatomy and physiology, natural sciences, microbiology, nutrition, and pharmacology. Composite tests which integrated general nursing content were available at both the licensed practical nurse and registered nurse level. Tests were also available for specific content areas in nursing: medical-surgical, obstetrics, pediatrics, psychiatric nursing. Examinations comprised of multiple-choice items were closely proctored, and students were allowed a maximum of two hours for each test.

Performance reports from these tests provided normative data on each student. Data included the raw score and percentile ranking of each student taking the test. The raw score was equal to the number of items the student answered correctly minus one third of those items answered incorrectly. Percentile ranking was given for each of the three categories of nursing programs: diploma, associate degree, and baccalaureate. The mean performance for the student's group was also included in the report (Let's Examine, 1980).

Description of the State Board Test Pool Examinations

The National League for Nursing also provided the examinations used for evaluation of minimum competency for licensure. These tests, required for registered nurse licensure, were divided into five separate multiple-choice examinations: medical, surgical, obstetric, pediatric, and psychiatric nursing. The minimum acceptable score for licensure in Florida was 350 for each of the five tests. Each test was limited to two hours, and proctored closely.

Selection of the Setting

Discussions with chairpersons responsible for ADN programs in Florida indicated that most educational mobility options available included some equivalency evaluation opportunities, but were limited to exemption from general education courses. In some programs, licensed practical nurses seeking the associate degree had been required to complete the entire sequence of nursing courses. In others, they were admitted to a program sequence different from that followed by native nursing students. Information from the educational consultant/representative of the Florida State Board of Nursing identified only one ADN program in Florida that granted advanced standing to practical nurses on the basis of licensure. This nursing program, located on the Clearwater campus of St. Petersburg Junior college, was unique in integrating licensed practical nurses into the regular sophomore nursing curriculum. This program was selected to provide data needed to evaluate the efficacy of articulation programs in facilitating educational and career mobility for the licensed practical nurse. Appropriate administrative personnel gave permission to conduct the study.

Description of the Setting

In August 1973, in answer to a demonstrated community need for increased numbers of nurses to provide skilled technical care to patients in area health agencies, St. Petersburg Junior College opened a career ladder associate degree nursing program on the Clearwater campus. The curriculum developers subscribed to the premise that the levels of technical nursing practice shared a common core of knowledge, attitudes, and skills. They espoused a philosophy of nursing education which permitted interfacing programs at various levels of nursing so that students might progress in a career development pattern which reduced redundancy of learning experiences, and facilitated mobility between levels of technical nursing practice by allowing open exit/entry. Learning activities and objectives for the four semesters were thus designed to permit native nursing students to exit at the end of the first academic session as certificated nursing assistants, or to transfer at the close of the second term to area vocational schools and complete requirements for eligibility for licensing as practical nurses. Licensed practical nurses were encouraged to enter the first semester of the sophomore year along with native nursing students for the purpose of completing requirements for eligibility for registered nurse licensure. The career ladder framework required division of course content into levels to allow for articulation of licensed practical nurses. (See Appendix for schematic describing the Clearwater campus career ladder nursing sequences.)

The first semester of the Clearwater nursing program presented fundamental nursing skills and theory. The second term of that academic year introduced the native freshman nursing student to basic concepts in medical-surgical nursing, uncomplicated maternity nursing, and normal growth and development in pediatrics. The first semester of the sophomore year introduced all students to intermediate medical and surgical nursing, basic psychiatric nursing, obstetrical complications and gynecology, and completed the sequence in maternal and child care with pediatrics. The final term of the program included two courses in medical-surgical nursing and advanced psychiatric nursing. Measures of student performance on the NLN Achievement Tests were drawn at three points in the curriculum: (1) all freshman students took the LPN-level NLN Achievement Tests on completion of the second academic term; licensed practical nurses took these same tests immediately prior to admission to the second year of the program, (2) RN-level tests for anatomy and physiology, microbiology, obstetrics, and pediatric nursing were administered at the end of the first term of the sophomore year. On completion of the sophomore year, all students took three tests for medical-surgical nursing, and tests for pharmacology and psychiatric nursing.

Sample Selection

All students admitted to the Clearwater nursing program for classes graduating between 1975 and 1980 constituted the study population (N = 367). Students were classified into two groups by status at admission to the program: native nursing students admitted 1973-1978 (N = 203), and licensed practical nurses admitted 1974-1979 (N = 164).

Hypotheses

To determine whether native nursing students and licensed practical nurses who were integrated into an associate degree nursing program were comparable, the following null hypotheses were proposed:

Hypothesis I

Licensed practical nurse students and native nursing students will not differ significantly on demographic characteristics of age, gender, or marital status.

Hypothesis II

Licensed practical nurse students and native nursing students will not differ significantly on cumulative college gradepoint average.

Hypothesis III

Licensed practical nurse students and native nursing students will not differ significantly on attrition.

Hypothesis IV

Licensed practical nurse students and native nursing students will not differ significantly on final mean numerical grades in sophomore nursing courses.

Hypothesis V

Licensed practical nurse students and native nursing students will not differ significantly on mean performance scores on LPN-level NLN Achievement Tests.

Hypothesis VI

Licensed practical nurse students and native nursing students will not differ significantly on mean performance scores on RN-level NLN Achievement Tests.

Hypothesis VII

Licensed practical nurse students and native nursing students will not differ significantly on mean performance scores on National State Board Test Pool Examinations for registered nurse licensure.

Procedures for Data Collection

The Clearwater nursing program maintained files on all students admitted to the program. Student files contained records which included date of birth, gender, and marital status, individual performance scores on the LPN-level and RN-level NLN Achievement Tests, computer printouts of cumulative college gradepoint average, and copies of the Florida State Board of Nursing report of scores on the five State Board Test Pool Examinations. Class lists of all students enrolled in nursing each semester, categorized by freshman or sophomore status, were on file in the chairman's office. Records of all course grades were available from teachers' grade books. Examining records of all students admitted to classes graduating between 1975 and 1980, the researcher abstracted data describing the demographic characteristics of age, gender, and marital status, total numbers admitted as native nursing students and licensed practical nurses, numbers in each group who left the program, term of exit, individual student cumulative college gradepoint average, final numerical grades in sophomore nursing courses, performance scores on LPN-level and RN-level NLN Achievement Tests, and on the State Board Test Pool Examinations for licensure.

Data describing academic performance in sophomore nursing courses were comprised of final numerical grades received for intermediate medical-surgical nursing, complicated obstetrics and gynecology, pediatrics, basic psychiatric nursing, advanced psychiatric nursing, and advanced medical-surgical nursing I and II. The LPN-level NLN Achievement Tests were Nursing Including Pharmacology (NIP) which includes basic medical-surgical nursing, maternal-child, and pharmacology, and Three Units of Content (TUC) which evaluates grasp of basic body structure and function, nutrition, and basics of nursing. The NLN tests for RN-level students were anatomy and physiology, microbiology, obstetrics, pediatrics, pharmacology, psychiatric nursing, and three tests in medical-surgical nursing. Until recently, natural science was also included in the required terminal Achievement Test sequence. The five component tests of the State Board Test Pool Examinations for registered nurse licensure were: medical, surgical, obstetric, pediatric, and psychiatric nursing.

Procedures for Data Analysis

Data analysis techniques used for intergroup comparisons in the State College of Arkansas CONE program (Garner, 1975) were replicated in this study, exclusive of ACT scores. Sophomore nursing course grades were substituted for the CONE study science course grades. As in the CONE evaluation, t test and chi square analyses were used to test the study hypotheses. Chi square has been commonly used with data in the form of frequencies (Guilford and Fruchter, 1973) and was selected to test those hypotheses which compared relative numbers of students per category. Difference of means t tests were applied in testing all study hypotheses relating to academic/cognitive performance. The level of statistical significance designated by the investigator as sufficient to reject any of the study's seven null hypotheses was .05.

Technique used with Hypotheses I and III

Testing the accuracy of both of these study hypotheses required analysis of frequency data:

H:I postulated no significant difference would be found between groups for demographic characteristics of age, gender, and marital status. Testing this required comparing numbers of students in each group falling under each demographic category.

H:III stated no significant difference in attrition would be found between the study groups, and required comparing numbers of students in each group who left the nursing program prior to the completion of the program of study.

Thus, the researcher selected chi square analysis as the statistical treatment appropriate to test the equality of the two population proportions examined under Hypotheses I and III. The level of statistical significance chosen as sufficient to reject the hypotheses of no difference between groups was $p \leq .05$.

Accurate determination of attrition

One criterion measure of program effectiveness had been the percentage of entering students who successfully completed the learning experiences and graduated. The multiple exit/entry structure of the Clearwater nursing program permitted students to withdraw and be re-admitted subsequently at the point of previous exit. Students exercising this option were not identified as re-entrants in program records. Licensed practical nurse students and native nursing students shared learning experiences only in the sophomore year of the Clearwater program. To test the hypothesis (III) that licensed practical nurses did not differ from native nursing students in attrition, the investigator had to accurately determine the point of program exit for native nursing students. The researcher resolved the problem by examining the data to determine (1) gross attrition by group, (2) net attrition by group, and (3) attrition by group during the sophomore year.

Techniques used with Hypotheses II, IV, V, VI, and VII

Difference of means *t* tests were used in testing the hypotheses regarding academic/cognitive performance. This test enabled the researcher to compare the mean performance of licensed practical nurse students and native nursing students as to cumulative college grade-point average (H:II), final numerical grades in sophomore nursing courses (H:IV), LPN-level NLN Achievement Tests (H:V), RN-level NLN Achievement Tests (H:VI), and National State Board Test Pool Examinations for registered nurse licensure (H:VII). The t test was applicable for examining these hypotheses as samples were large and there was no reason to believe that the population distribution was skewed, or that the two samples would have markedly differing variances (Guilford and Fruchter, 1973). To reject a given hypothesis, numerical evidence of difference between groups had to be statistically significant at the .05 level.

Additional technique used with Hypotheses V, VI, and VII. To determine whether groups differed significantly in overall performance on standardized measures generally considered predictive of success in nursing, i.e., LPN-level and RN-level NLN Achievement Tests, and State Board Test Pool Examinations for registered nurse licensure, an additional statistical technique was used to test the hypotheses (V, VI, and VII). Data were collapsed under categories of significant/not significant, and subjected to chi square analyses. The level of statistical significance selected as sufficient to reject the hypotheses of no difference between groups was $p = .05$, consistent with that required to reject all other study hypotheses.

CHAPTER IV

PRESENTATION OF FINDINGS

Product evaluation has been used to measure program outcomes, judge efficiency and effectiveness of the learning experiences, and relate final learning gains to program offerings (Burnett, 1976; Meleis and Benner, 1975). Burnett (1976) stated that appraisal of the program product, i.e., the student/graduate, was critical to effective program evaluation. Farran (1979) included achievement on standardized achievement tests and State Board Examinations as two important measures in evidence of student learning. This study sought to determine whether native nursing students and licensed practical nurses, educated elsewhere and integrated into an on-going associate degree nursing program, were comparable in academic performance within and on completion of the program of study.

Native nursing students enrolled in the associate degree program on the Clearwater campus of St. Petersburg Junior College were assigned to Group 1. Licensed practical nurses, who had been integrated into the second academic year of the Clearwater nursing program, were assigned to Group 2. Groups were compared as to demographic characteristics, attrition, cumulative college gradepoint average, mean scores in sophomore nursing courses, LPN-level National League for Nursing Achievement Tests, RN-level National League for

Nursing Achievement Tests, and the National State Board Test Pool Examinations for registered nurse licensure. Seven null hypotheses were generated and tested by Chi square and/or t test analyses to determine whether groups were comparable in performance on the measures selected for evaluation.

This chapter is organized around the seven study hypotheses and presents the results of the study findings. The data are presented in statistical format under each hypothesis. Conclusions are discussed in Chapter V.

Hypothesis I: Licensed practical nurse students and native nursing students will not differ significantly on demographic characteristics of age, gender, or marital status.

Comparison of Demographic Characteristics

Age Distribution

Examination of data describing the demographic characteristics of the study population using Chi square analysis found a highly significant ($p < .005$) difference in age distribution among the two groups of students. As shown in Table 1, 52% of licensed practical nurses (Group 2) were 31 years or older compared with 27% of native nursing students (Group 1). Although the mean age for both groups was 27, only 5% of Group 2, licensed practical nurses, were less than age 21. Native nursing students tended to be younger; 30% were below 21 years of age. The majority of students in both groups were between 21 and 30. Only 5% of native nursing students were 41 years or older compared with 25% of licensed practical nurses.

Table 1

Comparison of Age Distribution
Between Study Groups

	Group 1[a] N	Group 1[a] %	Group 2[b] N	Group 2[b] %	Combined Total N	Combined Total %
17 - 20	61	30.0	8	5.0	69	18.8
21 - 30	87	43.0	71	43.0	158	43.0
31 - 40	44	22.0	44	27.0	88	24.0
41 +	11	5.0	41	25.0	52	14.2
TOTALS	203	100.0	164	100.0	367	100.0
Mean Age	27		27		27	

Chi square = 55.14, 3 df Significance: $p < .005$

[a] Group 1 = Native nursing students

[b] Group 2 = Licensed practical nurses

Gender Distribution

Although both groups of students were predominantly female, comparison by gender (Table 2) indicated a significant difference between the study groups ($p < .005$). More males (15.8% were members of Group 1, native nursing students. Male licensed practical nurses (Group 2) totaled 6%.

Table 2

Comparison of Distribution of Gender Between Study Groups

Gender	Group 1[a] N	Group 1[a] %	Group 2[b] N	Group 2[b] %	Combined Total N	Combined Total %
Female	171	84.2	154	93.9	325	88.5
Male	32	15.8	10	6.0	42	11.5
TOTALS	203	100.0	164	100.0	367	100.0

Chi square = 8.78, 1 df Significance: $p < .005$

[a] Group 1 = Native nursing students

[b] Group 2 = Licensed practical nurses

Marital Status Distribution

Of the demographic variables examined in the study, only marital status appeared unrelated to reference group membership ($p > .975$). Essentially equal percentages of married students were found among both groups. A similar finding was revealed regarding the percentage of each group who had never wed. However, the group of native nursing students contained fewer members who had been divorced, separated, or widowed. Of all students under the classification of divorced, separated, or widowed, 58% were members of Group 2, licensed practical nurses.

Table 3

Comparison of Marital Status Distribution Between Study Groups

Marital Status	Group 1[a] N	Group 1[a] %	Group 2[b] N	Group 2[b] %	Combined Total N	Combined Total %
Married	92	45.3	70	45.7	162	44.2
Never Wed	97	47.3	75	45.7	172	46.9
Other[c]	14	6.8	19	11.6	33	8.9
TOTALS	203	100.0	164	100.0	367	100.0

Chi square = 2.78, 2 df Significance: $p > .975$

[a] Group 1 = Native nursing students

[b] Group 2 = Licensed practical nurses

[c] Other = Divorced, separated, widowed

Hypothesis II: Licensed practical nurse students and native nursing students will not differ significantly on cumulative college gradepoint average.

Comparison of Cumulative College Gradepoint Average

Data describing cumulative college gradepoint average (GPA), shown in Table 4, revealed this variable as statistically significant in favor of native nursing students ($p < .001$). The mean cumulative college gradepoint average found for Group 1, native nursing students, was 3.15 with a standard deviation of 0.44. For Group 2, licensed practical nurses, the mean GPA was 2.98, and 0.43 standard deviation. A t value of 3.22 was obtained for the difference of means between groups.

Table 4

Comparison of Cumulative College Gradepoint Average Between Study Groups

	N	Mean	S.D.	*t*	df	2 Tail Prob
Group 1[a]	148	3.15	0.44	3.22	265	0.001
Group 2[b]	119	2.98	0.43			

[a] Group 1 = Native nursing students

[b] Group 2 = Licensed practical nurses

Hypothesis III: Licensed practical nurse students and native nursing students will not differ significantly on attrition.

Comparison of Attrition

A major concern in program evaluation is determining the degree of retention and graduation of students. Attrition has been of particular concern to nursing educators. For the past several years, attrition from basic registered nurse preparatory programs has averaged 25% (National League for Nursing, 1978a). Declining enrollments and high attrition have had serious implications for curriculum decisions for nursing education.

Discussions with the Clearwater nursing faculty of St. Petersburg Junior College disclosed their informal observations that attrition from their program was "low". Further, they observed that adjustment to the demands of the nursing curriculum was necessary for students to complete the program successfully. They believed the student's response to the initial program session determined persistence and success. The career ladder structure admitted native nursing students to the first academic session. Licensed practical nurses were admitted to the third academic term. Further, the multiple entry/exit structure permitted withdrawal and subsequent readmission without penalty. Thus, three measures of comparative attrition were calculated. As general program records did not identify students as readmits, but rather as new entrants, attrition was calculated for gross admissions and withdrawals. This information is presented in Table 5. Data in Table 6 describes the net program attrition by group. Table 7 presents attrition calculated for students admitted under the Comprehensive Employment Training Act (CETA). Table 8 shows comparison of attrition among native nursing students and licensed practical nurses in the cophomore year. Each attrition comparison will be discussed under its respective heading.

Gross Admissions and Withdrawals

Comparisons of gross admissions and withdrawals, shown in Table 5, revealed that total attrition from the Clearwater nursing program during the study years (21.5%) was slightly below the reported national average (25%) for associate degree nursing programs. With the exception of one academic year, 1976-1977, during which the combined group attrition (29%) rose above the national average, the aggregate attrition had been remarkably low, ranging from 8 to 18%. Discussions with faculty disclosed that the 1976-1977 academic year had included the admission of the first group of native nursing students selected and funded under the Federal Comprehensive Employment Training Act (CETA). This prompted one additional calculation of attrition (See Table 7). Calculations disclosed that 28.9% of the total for native nursing students admitted to the Clearwater nursing program had withdrawn prior to completing the nursing sequence. Only 12.8% of licensed practical nurses, however, had failed to complete the program successfully. Of the 22% of all students failing to complete the program successfully, 16% were members of Group 1.

Table 5

Comparison of Gross Admissions and Withdrawals Between Study Groups

Academic	Group 1[a]			Group 2[b]			Combined Total		
Year	Admits	Left	%	Admits	Left	%	Admits	Left	%
1973 - 74	32	8	25.0	23	0	0	55	8	14.5
1974 - 75	31	5	16.0	31	0	0	62	5	8.0
1975 - 76	32	7	22.0	23	3	13.0	55	10	18.1
1976 - 77	44	17	39.0	22	2	9.0	66	19	28.8
1977 - 78	32	6	19.0	27	2	7.0	59	8	13.5
1978 - 79	32	7	22.0	38	0	0	70	7	10.0
1979 - 80[c]		8			14			22	
TOTALS	203	58	28.9	164	21	12.8	367	79	21.5

[a] Group 1 = Native nursing students

[b] Group 2 = Licensed practical nurses

[c] Admissions for academic year 1979 - 80 excluded from study.

Net Program Attrition

Although readmits were not clearly identified in general program records, close examination of class lists identified those students admitted on more than one occasion during the period selected for study. Fifteen native nursing students were so identified, 12 of whom subsequently graduated during the time period under investigation.

This resulted in a net loss of three native nursing student readmits. During the same period, five licensed practical nurses withdrew and were subsequently readmitted. Of these students, only one failed to graduate following readmission. Table 6 presents attrition comparisons as adjusted for readmissions. The data disclosed a significant difference in attrition between groups ($p < .005$) in favor of the licensed practical nurse group. Net attrition among native nursing students (Group 1) was more than twice as high as for licensed practical nurses (Group 2). Nearly 23% of Group 1 students failed to complete the program successfully as contrasted with approximately 10% of Group 2.

Table 6

Comparison of Net Attrition
Between Study Groups

Completed Program	Group 1[a]		Group 2[b]		Combined Total	
	N	%	N	%	N	%
Yes	157	77.3	147	89.6	304	82.8
No	46	22.7	17	10.4	63	17.2
TOTALS	203	100.0	164	100.0	367	100.0

Chi square = 35.86, 1 df Significance: $p < .005$

[a] Group 1 = Native nursing students

[b] Group 2 = Licensed practical nurses

Comprehensive Employment Training Act (CETA) student attrition

The unusual increase in attrition during the 1976-1977 academic year warranted explanation, resulting in one additional measure of program attrition. During that academic year, a small group (N = 11) of native nursing students, Group 1, were admitted to the Clearwater program under federal funding from the Comprehensive Employment Training Act. Attrition was high among these culturally and/or educationally disadvantaged students (63.5%), which markedly increased Group 1 attrition for that year by 9%, and raised total attrition for 1976-1977 from 18.1% to the 28.8% recorded in Table 5. Aggregate attrition among native nursing students was also affected, rising from a calculated 27.7% to the 28.9% also shown in Table 5. Attrition among CETA students is shown in Table 7.

Table 7

Attrition Among CETA Students

Academic Year	Number Admitted	Withdrew	%
1976 - 1977	11	7	63.5
1978 - 1979*	12	1	8.3
1979 - 1980		5	45.5
TOTALS	23	13	56.6

*Excluded from study. Remaining CETA students were members of 1981 graduating class. Attrition shown separately due to the impact on native nursing student attrition.

Attrition in Sophomore Year

Observations by the Clearwater nursing faculty that adjustment to the initial program session was necessary for students to persist and succeed in the program suggested examining attrition in the sophomore year. If faculty observations were correct, attrition among native nursing students (Group 1) should be lower in the second year. Further, the first academic session of the sophomore year provided licensed practical nurses (Group 2) with their initial experiences in the associate degree program, and introduced them to the role and functions of the registered nurse. Although these students had previous education experience in nursing in their vocational programs, the investigator considered the possibility that an increasingly complex theoretical framework, and the demands for a change in level of responsibility for patient care, might require an adjustment similar to that experienced by entering freshmen.

Program records showed that 171 of the 203 native nursing students admitted to the program had entered the sophomore year (84.3%). Table 8 presents data comparing attrition from study groups in the sophomore year. Of native nursing students admitted to the sophomore year, 91.8% completed the program successfully. A clear majority (89.6%) of the licensed practical nurses also achieved this goal. Statistical analysis using chi square revealed no significant difference between groups ($p > .90$).

Table 8

Comparison of Attrition in Sophomore Year

Completed Program	Group 1[a] N	Group 1[a] %	Group 2[b] N	Group 2[b] %	Combined Total N	Combined Total %
Yes	157	91.8	147	89.6	304	90.7
No	14	8.2	17	10.4	31	9.3
TOTALS	171	100.0	164	100.0	335	100.0

Chi square = 0.548, 1 df Significance: $p > .90$

[a] Group 1 = Native nursing students

[b] Group 2 = Licensed practical nurses

Hypothesis IV: Licensed practical nurse students and native nursing students will not differ significantly on final mean numerical grades in sophomore nursing courses.

Comparative Performance in Sophomore Nursing Courses

Analysis of data describing mean final numerical grades in sophomore nursing courses found no significant difference between groups in academic achievement (See Table 9). Although Group 1, native nursing students displayed a slightly lower mean numerical grade (87) in medical-surgical nursing compared with 93 for licensed practical nurses, Group 2, less variance in final student grade was evident from the smaller standard deviation (4.8). As Table 9 shows, greater variance of final numerical grades within Group 2 was also

Table 9

Comparison of Mean Numerical Scores in Sophomore Nursing Courses

	N	Mean	S.D.	t	df	2 Tail Prob
Medical-Surgical						
Group 1 (native)	167	87.33	4.78	-1.00	276	0.318
Group 2 (LPN)	131	92.78	70.14			
Obstetrics						
Group 1 (native)	164	84.32	6.33	1.10	297	0.271
Group 2 (LPN)	135	83.56	5.42			
Pediatrics						
Group 1 (native)	160	90.34	4.80	1.53	289	0.126
Group 2 (LPN)	131	89.46	5.02			
Psychiatric						
Group 1 (native)	160	92.13	6.76	1.67	287	0.095
Group 2 (LPN)	129	90.79	6.61			

evident (S.D. 70.1). The two-tail t test, applicable in testing the null hypothesis which predicts no direction of difference (Guilford and Fruchter, 1973), revealed no significant difference in group means. Further, findings from other sophomore courses in obstetrics, pediatrics, and psychiatric nursing revealed no significant difference in academic performance as measured by mean final numerical grade.

Hypothesis V: Licensed practical nurse students and native nursing students will not differ significantly on mean performance scores on LPN-level NLN Achievement Tests.

Comparisons of Mean Raw Scores on LPN-level NLN Achievement Tests

Comparisons of mean scores on LPN-level NLN Achievement Tests are shown in Tables 10 and 11. Table 10 presents comparative group performance on Nursing Including Pharmacology (NIP): medical-surgical, maternal-child, pharmacology, and total raw score. Table 11 presents comparative group performance on Three Units of Content (TUC): body structure, basic nursing, nutrition, and total raw score. Performance on these two LPN-level NLN Achievement Tests has been used by faculty in vocational programs to evaluate terminal performance, predict performance on the practical nurse examinations for licensure, and in program evaluation. This study compared mean raw scores achieved by native nursing students who had completed the first academic year of an associate degree program with those demonstrated by licensed practical nurses who were integrated into the sophomore class to

Table 10

Comparison of Selected Mean Scores on NIP
LPN -level NLN Achievement Tests I

	N	Mean	S.D.	t	df	2 Tail Prob
NIP medical-surgical						
Group 1 (native)	148	52.64	39.80	-0.08	264	0.938
Group 2 (LPN)	118	52.92	6.75			
NIP maternal child						
Group 1 (native)	148	31.95	27.47	0.19	264	0.853
Group 2 (LPN)	118	31.31	27.86			
NIP pharmacology						
Group 1 (native)	146	23.37	21.66	-0.03	262	0.978
Group 2 (LPN	118	23.43	4.03			
NIP total raw						
Group 1 (native)	148	102.20	12.95	-2.67	264	0.008
Group 2 (LPN)	118	106.40	12.52			

determine their comparative status on entry into the second year of the Clearwater nursing program.

Nursing Including Pharmacology

Although the t test shown in Table 10 disclosed a significant difference in favor of Group 2, licensed practical nurses, for NIP total raw score, comparisons of the three components of that achievement test failed to show significant differences between the two groups; means were essentially equal. However, the standard deviations for the medical-surgical and pharmacology components were smaller in Group 2, indicating less variance in score among licensed practical nurses, and resulting in the nonsignificant negative t value.

Three Units of Content

Significant differences were also found in favor of Group 2, licensed practical nurses, on TUC components of body structure, basic nursing, and total raw score (See Table 11). Comparisons of the TUC nutrition component, however, showed no significant difference between groups. Native nursing students, Group 1, displayed lower mean scores and higher standard deviations for TUC components on body structure and total raw scores, contributing to the negative t values. Although the mean for Group 1 was 10.9% higher on the nutrition component, a greater standard deviation was also evident. On TUC basic nursing, native nursing students displayed a mean score

Table 11

Comparison of Selected Mean Scores on TUC
LPN-level NLN Achievement Tests II

	N	Mean	S.D.	t	df	2 Tail Prob
TUC body structure						
Group 1 (native)	145	32.16	8.40	-3.21	258	0.002
Group 2 (LPN)	115	35.15	6.02			
TUC basic nursing						
Group 1 (native)	145	34.22	6.88	-2.35	258	0.020
Group 2 (LPN)	115	36.24	6.93			
TUC nutrition						
Group 1 (native)	145	33.09	31.58	0.91	258	0.365
Group 2 (LPN)	115	30.37	6.98			
TUC total						
Group 1 (native)	145	96.59	21.34	-2.10	258	0.037
Group 2 (LPN)	115	101.53	15.18			

of 34.22 and a standard deviation of 6.88 compared with 36.24 and 6.93 for licensed practical nurses.

To determine the significance of the findings reported in Tables 10 and 11 and compare the entry status of licensed practical nurses, Group 2, and native nursing students, Group 1, prior to admission to the sophomore year, chi square analysis was used to examine the grouped data. Performance measures on the two LPN-level NLN Achievement Tests (NIP and TUC) were collapsed under significant/ not significant. Results are reported in Table 12. No significant difference in overall performance was found by intergroup comparison of the grouped data.

Table 12

Comparison of Overall Performance
on LPN-level NLN Achievement Tests

	Group 1[a]		Group 2[b]		Combined Total	
	N	%	N	%	N	%
Significant	0	0.0	4	50.0	4	25.0
Not significant	8	100.0	4	50.0	12	75.0
TOTALS	8	100.0	8	100.0	16	100.0

Chi square = 2.16, 1 df Significance: $p > .975$

[a] Group 1 = Native nursing students

[b] Group 2 = Licensed practical nurses

Hypothesis VI: Licensed practical nurse' students and native nursing students will not differ significantly on mean performance scores on RN-level NLN Achievement Tests.

Comparisons of Mean Raw Scores on RN-level NLN Achievement Tests

Intergroup comparisons of performance on RN-level NLN Achievement Tests are shown in Tables 13 through 15. Table 13 presents data describing performance on tests in obstetrics, pediatrics, psychiatric nursing, and pharmacology. Table 14 displays comparative performance data for three tests in medical-surgical nursing. Comparisons of mean raw scores in anatomy and physiology, microbiology, and natural science are shown in Table 15.

Nursing Specialties

When licensed practical nurses, Group 2, were compared with native nursing students, Group 1, on mean raw scores achieved on RN-level NLN Achievement Tests in nursing specialties of obstetrics, pediatrics, psychiatric nursing and pharmacology, a statistically significant difference between groups was found on only one test, pharmacology. The lone significant t value in Table 13 (-3.75) in favor of licensed practical nurses, however, was not preceded by a similar finding on the NIP pharmacology component shown in Table 10 (p. 65). No statistically significant difference between groups was evident from comparisons of mean raw scores on other RN-level tests in obstetrics, pediatrics, and psychiatric nursing.

Table 13

Comparison of Selected Mean Scores on
RN-level NLN Achievement Tests
in Nursing Specialties

	N	Mean	S.D.	t	df	2 Tail Prob.
Total Obstetrics						
Group 1 (native)	162	69.95	14.69	0.98	293	0.32
Group 2 (LPN)	133	68.24	15.05			
Total Pediatrics						
Group 1 (native)	162	81.58	11.34	0.25	293	0.79
Group 2 (LPN)	133	81.24	11.94			
Total Psychiatric						
Group 1 (native)	158	81.79	17.95	0.25	285	0.80
Group 2 (LPN)	129	81.32	14.53			
Total Pharmacology						
Group 1 (native)	156	59.97	15.61	-3.75	279	0.00
Group 2 (LPN)	125	66.70	14.03			

Medical-Surgical Nursing

T test comparisons of performance on the three tests on medical and surgical nursing, reported in Table 14, also showed no significant difference between groups. Similar mean raw scores and standard deviations were displayed by both native nursing students and licensed practical nurses. Less variance in scores among licensed practical nurses contributed to the negative t values shown for comparisons of Nursing Care 1 and Nursing Care 2.

Science Tests

Comparisons of the Rn-level science Achievement Tests revealed that the highly significant statistical difference (p .002) in favor of Group 2 found on the TUC body structure component (See Table 11, p. 67) was not reflected in similar significant difference on the RN-level test for anatomy and physiology. Comparisons of performance on the three science achievement tests for natural science, microbiology, and anatomy and physiology also failed to identify any significant differences between licensed practical nurses and native nursing students. Table 15 reflects comparisons of RN-level science Achievement Tests.

Further, testing by means of chi square analysis of the grouped data, as applied to the LPN-level performance measures, collapsing findings into significant/not significant, also failed to disclose any significant differences between groups. Results of significance test are reported in Table 16.

Table 14

Comparisons of Selected Mean Scores on RN-level NLN Achievement Tests in Medical-Surgical Nursing

	N	Mean	S.D.	t	df	2 Tail Prob.
Total Nursing Care 1						
Group 1 (native)	107	75.87	12.19	-0.88	187	0.38
Group 2 (LPN)	82	72.80	11.69			
Total Nursing Care 2						
Group 1 (native)	107	71.26	13.32	-0.83	187	0.40
Group 2 (LPN)	82	72.80	11.69			
Total Nursing Care 3						
Group 1 (native)	106	63.95	13.14	0.27	186	0.79
Group 2 (LPN)	82	63.40	14.03			

Table 15

Comparisons of Selected Mean Scores on
RN-level NLN Achievement Tests in
Sciences

	N	Mean	S.D.	t	df	2 Tail Prob
Total Natural Science						
Group 1 (native)	103	63.51	20.67	1.12	184	0.26
Group 2 (LPN)	83	60.26	18.27			
Total Microbiology						
Group 1 (native)	152	64.49	15.73	-1.06	275	0.29
Group 2 (LPN)	125	66.44	14.63			
Total Anatomy and Physiology						
Group 1 (native)	106	50.35	18.94	1.02	189	0.30
Group 2 (LPN)	85	47.37	18.31			

Table 16

Comparison of Overall Performance
on RN-level NLN Achievement Tests

	Group 1[a]		Group 2[b]		Combined Total	
	N	%	N	%	N	%
Significant	0	0.0	1	10.0	1	5.0
Not significant	10	100.0	9	90.0	19	95.0
TOTALS	10	100.0	10	100.0	20	100.0

Chi square = 1.05, 1 df Significance: $p > .975$

[a] Group 1 = Native nursing students

[b] Group 2 = Licensed practical nurses

Table 16 summarizes the findings of the grouped comparisons of performance on the ten RN-level NLN Achievement Tests, and discloses no statistically significant difference between groups.

Hypothesis VII: Licensed practical nurse students and native nursing students will not differ significantly on mean performance scores on National State Board Test Pool Examinations for registered nurse licensure.

Comparisons of Mean Scores on Licensure Examinations

Table 17 presents $\underline{t}$ test comparisons between licensed practical nurses and native nursing students for the five components of the National State Board Test Pool Examinations for registered nurse licensure. Of the five nursing examinations, i.e., medical, surgical, obstetrics, pediatrics, and psychiatric nursing, statistically

Table 17

Comparisons of Mean Scores on State Board Test Pool Examinations for Registered Nurse Licensure[a]

	N	Mean	S.D.	t	df	2 Tail Prob
Medical Nursing						
Group 1 (native)	144	518.45	98.87	-2.97	248	0.003
Group 2 (LPN)	106	555.40	94.95			
Surgical Nursing						
Group 1 (native)	144	515.22	97.03	-2.46	248	0.010
Group 2 (LPN)	106	543.43	78.19			
Obstetric Nursing						
Group 1 (native)	143	534.67	106.21	-1.05	248	0.290
Group 2 (LPN)	107	548.36	96.57			
Pediatric Nursing						
Group 1 (native)	143	522.86	104.37	-0.70	248	0.480
Group 2 (LPN)	107	531.92	95.66			
Psychiatric Nursing						
Group 1 (native)	143	531.12	89.08	-0.44	247	0.660
Group 2 (LPN)	106	536.03	84.05			

[a] Differences in Ns reflect numbers of students releasing SBTPE reports of scores

significant differences favoring Group 2, licensed practical nurses, were found for two components. Scores in medical and surgical nursing examinations evidenced a marked difference in mean score achieved. Group 2 demonstrated a mean score of 555.40 and standard deviation of 94.95 on the medical nursing examination. This was compared with a Group 1 mean score of 518.45 and standard deviation of 98.87. Similar findings were present between mean scores on the surgical nursing examination. Again, Group 2 had the higher score (543.43) and smaller standard deviation (78.19).

The $\underline{t}$ values for comparisons between licensed practical nurses and native nursing student groups were not significant at the .05 level for the following areas: obstetrics, pediatrics, and psychiatric nursing. Smaller standard deviations for Group 2 on all components of the National State Board Test Pool Examinations for registered nurse licensure, however, indicated less variance in scores achieved by licensed practical nurses.

To determine the significance of the findings reported in Table 17 and compare the overall performance of graduates in each group on the licensure examinations, chi square analysis of the grouped data, as applied to the LPN-level and RN-level NLN Achievement Test performance measures, was accomplished by collapsing findings into significant/not significant categories. Results of significance testing are reported in Table 18. A pattern similar to that shown by chi square analysis of the grouped data on LPN-level NLN Achievement

Tests (See Table 12, p. 68) and RN-level NLN Achievement Tests (See Table 16, p. 74) emerged from the analysis of grouped performance on State Board Test Pool Examinations (SBTPE).

Table 18

Comparison of Overall Performance
on SBTPE Licensure Examinations

	Group 1[a]		Group 2[b]		Combined Total	
	N	%	N	%	N	%
Significant	0	0.0	2	40.0	2	20.0
Not significant	5	100.0	3	60.0	8	80.0
TOTALS	5	100.0	5	100.0	10	100.0

Chi square = 2.50, 1 df Significance: $p > .975$

[a] Group 1 = Native nursing students
[b] Group 2 = Licensed practical nurses

Although the t value for the individual examinations had shown a statistically significant difference in favor of Group 2 in medical and surgical nursing (Table 17), when data were collapsed into significant/not significant categories, chi square analysis failed to reveal any significant difference between the overall performance of native nursing students, Group 1, and licensed practical nurses, Group 2.

Summary of Findings

1. Examination of data describing the demographic characteristics of the study population found significant differences between groups.

a. Native nursing students tended to be younger; 30% were less than 21 years old. Only 5% of the licensed practical nurses were below 21 years of age.

b. More males (15.8%) were native nursing students; only 6% of the licensed practical nurse group were male.

c. Fewer native nursing students than licensed practical nurses had been separated, divorced, or widowed.

2. Native nursing students demonstrated a higher cumulative college gradepoint average (3.15) than did Group 2 counterparts (2.98).

3. Comparisons of attrition found the following:

   a. Gross attrition during the study years was 21.5%; 28.9% of native nursing students and 12.8% of licensed practical nurses withdrew following admission to the Clearwater associate degree nursing program.

   b. Net attrition among native nursing students (23%) was more than twice as high as for licensed practical nurses (10%).

   c. The two groups did not differ significantly on attrition from the sophomore year of the nursing curriculum. The aggregate attrition during the sophomore year was 9.3%; 8% of native nursing students, and 10% of licensed practical nurses withdrew from the second year of the Clearwater nursing curriculum.

4. Although licensed practical nurses displayed a higher final mean numerical grade (93) in sophomore medical-surgical nursing than

native nursing students (83), comparing the overall academic performance in sophomore nursing courses disclosed no significant difference between groups.

5. Although licensed practical nurses displayed a higher mean raw score on some components of the LPN-level National League for Nursing Achievement Tests, the two groups did not differ significantly in overall performance on these tests.
6. Licensed practical nurses displayed a higher mean score on one of the ten RN-level National League for Nursing Achievement Tests: pharmacology. However, the two groups did not differ significantly on overall performance on these tests.
7. Licensed practical nurses displayed a higher mean raw score on the National State Board Test Pool Examinations in medical and surgical nursing than their native nursing student counterparts. However, comparing overall performance on the five components of the examinations for registered nurse licensure showed no significant difference between the groups.

Analysis of data describing comparative academic performance in nursing failed to reveal any statistically significant difference between licensed practical nurse students and native nursing students in overall performance within and on completion of the Clearwater associate degree nursing curriculum.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

The latter days of the 1970s brought a rising national concern over the continuing critical shortage of registered nurses. Forecasts for the next decade predicted a growing need for skilled nursing services, and a diminishing supply of nurse manpower resulting from increasing attrition, declining enrollments, and graduations from basic nursing programs. With the advent of the 1980s, the predictions came to pass. Increasing numbers of health care consumers sought services from a continuously understaffed system. Rising demands for health care coincided with a retrenchment in nursing as fewer persons sought that career. Several occupational issues also arose. The struggle for professionalism by nurses raised unanswered questions regarding minimum preparation for practice, credentialing, and career mobioity. Nursing education was challenged to recruit and expedite preparation of new entrants to the field to meet society's burgeoning needs for care. Granting advanced standing to licensed practical nurses entering registered nurse curricula appeared to offer one solution. However, the literature offered little to evaluate the effectiveness of articulation as an approach to meeting the needs of the profession and of licensed practical nurses for educational and career mobility.

This study sought to determine the effectiveness of the associate degree nursing program on the Clearwater campus of St. Petersburg Junior College, Clearwater, Florida, in facilitating educational and career mobility for licensed practical nurses. This program permitted licensed practical nurses to articulate into the sophomore year, granting advanced standing on the basis of previous licensure. The study was designed to determine whether native nursing students and licensed practical nurses, educated elsewhere and integrated into an on-going associate degree nursing program, were comparable in academic performance within and on completion of the program of study.

Postulating no significant difference between groups would be found, seven null hypotheses were proposed and tested. The study compared groups on demographic variables of age, gender, and marital status; cumulative college gradepoint average; attrition; final numerical scores in sophomore nursing courses; performance scores on National League for Nursing Achievement Tests for the licensed practical nurse (LPN) and registered nurse (RN) level of education, and performance on the National State Board Test Pool Examinations for registered nurse licensure. Institutional and program records of all students admitted to the program for classes graduating between 1975 and 1980 were reviewed (N = 367). Relevant data pertaining to study measures were retrieved and subjected to comparative analyses. Findings were examined for evidence supporting or rejecting articulation as an effective approach to educational and career mobility for the licensed practical nurse. Marked differences found between groups in demographic composition and cumulative college gradepoint average served to reject Hypotheses I and II. Hypotheses III through VII could not be rejected, since no significant difference in attrition in the sophomore year, or in performance on the selected cognitive measures considered predictive of success in nursing were found between groups. In general, all measures of cognitive performance in nursing indicated that licensed practical nurses who articulated into the sophomore year of the Clearwater associate degree nursing program were comparable to native nursing students in achieving course and program goals, and equally successful in attaining registered nurse licensure.

This chapter discusses the major findings, and presents conclusions and recommendations in regard to each of the seven hypotheses. Suggestions for further study and a closing statement complete the dissertation.

Discussion and Conclusions

Nursing educators have been faced with the problem of preparing sufficient new entrants to the field of nursing to meet society's increasing needs for health care in an era of declining enrollments. Kaiser's (1975) study indicated that applicants to licensed practical nurse programs and to associate degree nursing programs came from the same demographic pool. This suggested that licensed practical nurses might make a successful transition to the next level of technical nursing if encouraged to enter associate degree nursing programs to qualify for registered nurse licensure. Further, if the premise that there existed a common core of nursing knowledge, attitudes, and skills shared by all levels of practitioners was valid, licensed practical nurses should be able to enter the associate degree program with advanced standing, and complete the program successfully. The findings of this study do not contradict that premise, rather they tend to support it.

Hypothesis I: Licensed practical nurse students and native nursing students will not differ significantly on demographic characteristics of age, gender, or marital status.

The findings of this study do not support the supposition that licensed practical nurse students and associate degree nursing students originate in the same applicant pool. Neither do they reject it. No attempt was made to control for number of years elapsed since the licensed practical nurse students in this study had entered their originating vocational programs. Study findings do suggest that the traditional college nursing student, i.e., the new high school graduate, is no longer in the majority in the student population of associate degree nursing programs. Only 30% of the native nursing student group were less than 21 years old; 55% were between 21 and 40. Of licensed practical nurse students, only 5% were below age 21, and 60% were between 21 and 40 years old. One quarter of the licensed practical nurses were over age 41. The demographic characteristics of the study population have several possible explanations. The small number of licensed practical nurses under age 21 (5%) may indicate that those among them who were potential associate degree nursing students on completing high school selected vocational nursing as a short route to entry to the health care field. Further, in an era of high unemployment, nursing has consistently offered new graduates a means to economic security.

Larger numbers of licensed practical nurses between 21 and 30 (43%) who entered the educational program preparing them for the next level of technical nursing, may have recently decided that nursing will continue to be their career of choice, and that they need further knowledge and skills to continue to progress in nursing. Proposed changes in the career structure of nursing may have provided impetus to re-enter the educational experience.

Larger numbers of native nursing students between 21 and 30 (43%) suggests that many have selected nursing as a second career. Some of these students may have been unsuccessful in securing a position in other fields. Others may have chosen nursing for their career on the basis of related experiences in other human services areas.

The finding that more males were among native nursing Group 1 was not surprising. In past years, nursing has not been a popular occupational choice for males, resulting in fewer males in the pool of licensed practical nurses seeking career mobility. Head of household responsibilities, perhaps, have necessitated postponing career goals.

Recommendations for Nursing Education

1. The demographic characteristics of the study population suggest that successful recruitment efforts should be directed toward

    a. encouraging licensed practical nurses to enter associate degree nursing programs and achieve career mobility to registered nurse status. Articulation programs granting advanced standing equivalent to previous educational preparation offer some incentive to continue their education and realize their career goals in a relatively short period of time.

    b. exploring associations with community programs which focus on aiding the displaced homemaker to find a new and rewarding interest in life and/or a career route to employment security. The small number of women who were separated, divorced, or widowed, suggests this pool has yet to be tapped.

    c. securing additional funding for potential students. Federal and state funds have been largely inaccessible to licensed practical nurses. Funding may encourage more males to explore nursing as a career.

2. The demographic characteristics of the study population indicate a need to identify appropriate learning activities which will stimulate interest in adult learners, and assist them in

succeeding in the curriculum. Research has shown that adult learners who re-enter the educational setting often face problems of poor self-image and reduced confidence in their ability to succeed (Staropoli and Waltz, 1978). Learning activities should be designed to encourage adult learners to share their perspectives and life experiences with their younger peers; the social mix may enhance the educational experience and expedite learning for both groups. Further, building a positive self-image for the adult learner, as well as for younger students, contributes to increased learning and success.

Hypothesis II: Licensed practical nurse students and native nursing students will not differ significantly on cumulative college gradepoint average.

The study findings of a higher cumulative college gradepoint average for native nursing students (3.15) may be consistent with the demographic findings that more native nursing students were among the youngest age group in the study (17-20). No attempt was made to correlate demographic characteristics of the study groups with cognitive measures. However, one explanation may be that native nursing students more recently completed their basic education in high school, and are accustomed to studying. Adult learners commonly experience difficulty in returning to the demands of study, and in selecting the important concepts. Others may find conflicts between the educational theories expounded, and their life experiences.

Informal discussions with students indicated many of the licensed practical nurses in this study were exployed full-time on evening and night shifts, and found little time to study. Many stated they believed the physical and emotional stress of working and carrying a full academic load compromised their capacity to learn and perform academically. No part-time study was available in the Clearwater curriculum. Further, the course of study required for licensed practical nurses to graduate within one year of enrollment entailed carrying 20 - 22 semester hours of academic load in each of the two terms of the sophomore year (See Appendix for description of career ladder curriculum). The necessity of carrying a full academic load, and emphasis on higher achievement in nursing courses (a minimum of 75 was required for a grade of C compared with the general college 70), may have contributed to lower cumulative gradepoint average.

Recommendations for Nursing Education

1. Lowering the grade requirements in nursing to 70 for a C, 80 for a B, and 90 for an A may serve to increase gradepoint average for many students. This action should be carefully considered, however, as it may be unacceptable to nursing faculty who believe 75 indicates achievement of minimum competence for safe practice. The primary question is whether or not raising gradepoint average is important in reducing attrition from academic failure.

2. Counseling students to reduce academic load may aid them in raising their grades in the courses they undertake. However, it also extends the time period required for completion of the program.

3. Identifying students' entry level of reading and numerical abilities and offering assistance where needed may be of assistance to those students whose entry skills are not consistent with the demands of the learning activities. Most nursing texts are written for above 12th grade reading level. Many community college students read below the 6th grade level. Identifying the students' preferred learning modality and individualizing learning activities to increase the relevance of new learning as associated with prior experiences may be effective in maximizing their academic potential (Wajdowicz, 1981).

Hypothesis III: Licensed practical nurse students and native nursing students will not differ significantly on attrition.

Study findings failed to reject the hypothesis. Attrition from the sophomore year, the only educational experience shared by licensed practical nurses and native nursing students, was essentially equal. Of those students entering the second year, 8% of native nursing students and 10% of licensed practical nurses withdrew from the program prior to completion.

Intergroup comparisons of attrition among native nursing students and licensed practical nurses showed a significantly lower net attrition among the latter. Higher attrition among native nursing students is consistent with the national averages in nursing education. The career ladder does offer the native nursing student an opportunity to 'step off' with a marketable credential, and the open entry/exit option permits students to return after a period of time without penalty to their standing. During the study years, several students returned, some after several years, to complete the program successfully.

Recommendations for Nursing Education

1. High retention rates for articulation students reduce overall program attrition --- one measure of program effectiveness. Articulation programs for licensed practical nurses provide a cost-effective method of increasing the registered nurse manpower pool by shortening preparation time. In a period of declining enrollments, articulation programs should be considered for additions to the nursing curriculum.

2. Higher attrition among native nursing students, and significantly high attrition among educationally disadvantaged students, should be closely examined to determine factors contributing to lowered success in attaining personal and program goals. The curriculum should be carefully examined to assure essential learning experiences, eliminate unnecessary ones, and increase learning options, individualizing the approach to learning to meet the needs of all students.

3. Learning support activities should be identified which increase students' performance in application of theory. Tutoring, learning facilitators, and alternate patterns of presentation of content (seminar, lecture, audiovisual) should be explored to

increase the students' chances of success in the educational setting. Efforts should be made to reduce attrition resulting from failure to achieve the necessary academic performance level.

Hypothesis IV: Licensed practical nurse students and native nursing students will not differ significantly on mean final numerical grades in sophomore nursing courses.

The study found no significant difference in mean final numerical grades in sophomore nursing courses. The finding that licensed practical nurses displayed a somewhat higher mean final grade in sophomore medical-surgical nursing (93 as compared with 87 for native nursing students) suggests that prior nursing experience enhanced their academic performance in this area. This is further indicated by the wide variance in grades achieved by licensed practical nurses (S.D. 70.14) in medical-surgical nursing. Those articulation students who had extensive experience in medical and surgical nursing may have contributed significantly to the higher mean score for the group. Others among that group scored proportionately lower, as evidenced by the large standard deviation. Native nursing students appeared to perform academically in medical and surgical nursing with more consistence, suggesting that their performance was largely predicated on program learning experiences. Group means for other sophomore courses in obstetrics, pediatrics, and psychiatric nursing showed no difference in academic performance between the groups. Informal discussions with students indicated few, either licensed practical nurses or native nursing students, had prior or coincidental experience in other areas of clinical nursing.

Recommendations for Nursing Education

1. The higher mean scores achieved by licensed practical nurses in medical-surgical nursing suggests efforts should be made to more accurately evaluate existing knowledge of nursing to

a. provide licensed practical nurses an opportunity to challenge required learning activities in the sophomore year and further reduce redundancy in their learning. Study findings suggest initial efforts should be directed at evaluating medical-surgical nursing knowledge and skills.

b. identify those with ability to function effectively as peer tutors and assist others in maximizing their learning potential.

2. Licensed practical nurses who are employed in medical-surgical nursing have been successfully encouraged to continue their education. Efforts should be made to encourage those employed in other clinical areas to consider entry into registered nurse curricula.

Hypothesis V: Licensed practical nurses and native nursing students will not differ significantly on mean performance scores on LPN-level National League for Nursing Achievement Tests.

The study found no significant difference between groups in overall performance on the LPN-level National League for Nursing Achievement Tests. However, the significant finding in favor of licensed practical nurses on components in basic nursing, body structure, and total raw scores on both composite tests suggests that licensed practical nurses entered the associate degree program with a knowledge of basic content needed for later learning in the registered nurse curriculum.

Further, the performance by native nursing students suggests that the Clearwater nursing faculty have been successful in achieving their goal of preparing freshman nursing students for the licensed practical nurse role within the first academic year.

Recommendations for Nursing Education

1. The higher mean performance by licensed practical nurses on total NIP (Nursing Including Pharmacology) and total TUC (Three Units of Content) indicated that pre-entry work experiences were concentrated in medical or surgical units. This further suggests a need for developing evaluative tools to permit licensed practical nurses to challenge required nursing content in the second year nursing courses.

2. The larger standard deviation among native nursing students for NIP medical-surgical nursing and pharmacology suggests a need to examine the freshman Clearwater curriculum related to these areas to evaluate the effectiveness of the learning activities. A large standard deviation was also found for nutrition on the TUC Achievement Test. Pharmacology and nutrition have been integrated

throughout the Clearwater nursing curriculum. Study findings indicate that student performance on standardized measures of grasp of content varies widely. Efforts should be undertaken to determine the reason for the wide variance in performance on these components of the nursing curriculum.

Hypothesis VI: Licensed practical nurses and native nursing students will not differ significantly on mean performance on RN-level NLN Achievement Tests.

Intergroup comparisons of mean performance scores on the ten RN-level NLN Achievement Tests administered in the Clearwater nursing program found a significant difference in favor of the licensed practical nurse on one, pharmacology. No significant difference in mean performance score between groups was found for obstetrics, pediatrics, psychiatric, or medical-surgical nursing.

Discussions with students and in-service directors at area health agencies disclosed that licensed practical nurses, during their employment, are often responsible for passing medications. Greater familiarity with drugs and selected dosages may account for the higher mean score on the NLN test in pharmacology.

Essentially equal performance scores on other components of the RN battery, however, suggest that sophomore nursing content and learning experiences are new, and essential, for both native nursing students and licensed practical nurses in the Clearwater nursing program. Similar means and standard deviations for both groups indicates both groups of students have gained essential information required to answer questions on the standardized NLN Achievement Tests in the course of their learning experiences.

The finding that licensed practical nurses achieved essentially the same mean performance scores as native nursing students is in contrast to their performance on LPN-level NLN Achievement Test components, and in sophomore medical-surgical nursing. This also suggests that, although prior nursing experience may have enhanced learning for the licensed practical nurse, sophomore nursing course have provided new content and experiences required for the registered nurse role.

Hypothesis VII: Licensed practical nurses and native nursing students will not differ significantly on mean performance scores on National State Board Test Pool Examinations for registered nurse licensure.

Although the chi square analysis of overall performance on the licensing examinations showed no significant difference between groups, significantly higher mean performance scores in favor of the licensed practical nurse were found on medical and surgical nursing component examinations. No significant difference between groups was found on obstetrics, pediatrics, or psychiatric nursing examinations.

Study findings further support a premise that licensed practical nurses' work experience was concentrated in medical and surgical areas before and after the Clearwater associate degree nursing curriculum experiences. The failure to identify a significant difference between study groups on measures of obstetrics, pediatrics, and psychiatric nursing is consistent with similar findings on the maternal-child component of the LPN-level NLN Achievement Tests for nursing specialties, i.e., obstetrics, pediatrics, and psychiatric nursing.

Recommendations for Nursing Education

The study findings of a significantly higher mean performance score on National State Board Test Pool Examinations in medical and surgical nursing in favor of the licensed practical nurse group further support the premise that evaluative tools should be developed to permit those with sufficient knowledge and skill to challenge that learning experience.

Recommendations for Further Study

The findings of this study suggest that articulation programs for licensed practical nurses can successfully provide educational and career mobility between levels of technical nursing. Licensed practical nurses constitute a large pool of potential applicants to associate degree nursing programs. As the net attrition for articulation students appears low, articulation programs may assist in counteracting declining enrollments and increase the number of graduations from registered nurse curricula.

This section presents recommendations for areas for further study. These suggestions are related to either replication of this study, or to further documentation and study of the findings.

1. An obvious limitation of this study was that the investigation was restricted to a single nursing education program. Study findings may have been influenced by environmental, context, input, and process variables. This study should be replicated in other articulation programs to determine whether similar results would be obtained, testing the reliability of the findings. In particular, replication in traditional programs where licensed practical nurses have been required to complete the entire nursing sequence is suggested.

2. Further examination of the relationship of demographic variables of age, gender, and marital status to other study measures of attrition and academic performance should be undertaken. Such composite demographic profiles should be examined in an effort to identify high-risk students early to reduce attrition from academic failure.

3. The study design used in this research should be modified to include compilation and examination of all data consistently available on students. For freshman native nursing students, such information may include pre-entrance examinations, reading level, learning styles, freshman general education course grades, and grades in freshman nursing courses. For sophomores, grades in the required general education courses should be added to the variables investigated in this study. Discriminant analysis should be used to identify the interactions and interrelationships between variables and determine those variables which predict performance.

Variables which indicate the possibility of academic distress should be identified. Such information should be helpful in counseling potential students and enrollees toward learning activities which would increase their chances for success in nursing curricula.

4. Comprehensive program evaluation should include collecting and examining closely the data on attrition and student performance on standardized norm-referenced tests as related to curriculum activities. Data analyses identifying correlations between nursing course grades, performance on NLN Achievement Tests, and State Board Test Pool Examinations would aid faculty in reviewing the curriculum patterns and practices. Such correlations would aid in evaluating the effects of teaching/learning modalities and assist in assuring essential learning experiences. Similar data should be solicited from other articulation programs and examined for indications of similarities and/or variance in student performance patterns.

5. To aid the faculty in determining whether an associate degree nursing program is effective in achieving its goal of preparing graduates to function at or above minimum competence in technical nursing, follow-up studies of graduates should be included in a comparative analysis of cognitive achievements and clinical evaluations while enrolled and clinical performance in later practice.

6. A study comparing the academic performance of native nursing students and licensed practical nurses, should be continued as part of the program evaluation at St. Petersburg Junior College to determine whether similar results are obtained subsequent to the proposed

expansion of the nursing program with increased numbers of both groups of students and more faculty. Recommended additions and modifications of this study design should be incorporated into future studies of the curriculum at St. Petersburg Junior College.

Closing Statement

As is true of many studies, this study raised additional questions regarding the efficacy of articulation programs in nursing, and indicated other areas for further exploration. Intergroup comparisons of academic performance in nursing-related and specific nursing components indicated that articulation presents a viable option for the licensed practical nurse. Evidence in this investigation of comparable performance on the selected measures of cognitive performance considered predictive of later success in nursing indicated that licensed practical nurses: (1) entered the associate degree nursing articulation program with nursing background equal to first year experiences of native nursing students in the St. Petersburg Junior College Clearwater program, (2) were able to successfully progress through the program without repeating learning experiences incorporated in the program's first year, (3) were successful in achieving course and program goals, and (4) demonstrated articulation was effective in assisting them to achieve educational and career mobility.

The study provided empirical support for the premise that articulation students may enter regular associate degree nursing programs with advanced standing, and with reasonable expectations of performing at a comparable level to their native nursing student peers. Further, study findings demonstrate that articulating licensed practical nurses may enter associate degree nursing programs with reasonable expectations of success both in the nursing program, and on standardized examinations for registered nurse licensure following graduation.

APPENDIX

Graduation

	Advanced Nursing Theory Advanced Nursing Lab Health Care Mgmt. Lab American Government Nursing Specialty	
Sophomore Spring	Intermediate Nursing Theory Intermediate Nursing Lab Developmental Psychology Health Care Management Microbiology Microbiology Lab	
Summer	English 1312 Transitional Nursing Transitional Nursing Lab	LPN entry & readmits
Freshman Spring	Freshman Nursing Freshman Nursing Lab English 1136 or 1146 Anatomy/Physiology Anatomy/Physiology Lab Physical Education	
Freshman Fall	Nursing Fundamentals Nursing Fundamentals Lab English 1103 or 1312 Survey of Health Fields Biophysical Science Biophysical Science Lab	Native nursing student entry
Summer	Developmental Nursing 50 Developmental Nursing 51 Mathematics 1371 Reading 9000	Limited to CETA students

Suggested sequence of courses by entry point to the associate degree nursing program at St. Petersburg Junior College, Clearwater campus, Clearwater, Florida, 1976-1981.

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BIOGRAPHICAL SKETCH

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Joea Maria Ellis Bierchen was born in Chicago, Illinois, on August 5, 1932. She received her basic nursing education at the Henrotin Hospital School of Nursing in Chicago, graduating in January 1955. She received her Bachelor of Science in Nursing degree from the University of Illinois at the Medical Center, College of Nursing, in 1970, followed by the Master of Science in Nursing in 1973.

Mrs. Bierchen has had extensive experience in obstetrical nursing, public health nursing, and commercial public relations. She has had the priviledge of teaching in diploma, baccalaureate, and associate degree nursing programs. Over 25 years of nursing experience, with nine years of teaching nursing, qualified her for appointment as an item writer for the National State Board Test Pool Examinations in 1979.

Mrs. Bierchen is a member of numerous professional organizations, has held office in several nursing organizations, and has been a presentor at local, regional, and national meetings. She has been a book reviewer for a national nursing publication, and is a reviewer for AvLine. She was chairman and principal author of the St. Petersburg Junior College nursing self-study committees for National League for Nursing and Southern Association of Colleges and Schools accreditation, and is a contributing author to a pediatric text currently in press.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Education.

Albert B. Smith TTL

Albert B. Smith, Chairman
Associate Professor of
Instructional Leadership and
Support

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Education.

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June 1981

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